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THE VIRTUES OF “COMMAND AND CONTROL” REGULATION: BARRING EXOTIC SPECIES FROM AQUATIC ECOSYSTEMS

Sandra B. Zellmer*

The Clean Water Act asserts the ambitious goal of eliminating water pollution and protecting the chemical, physical, and biological integrity of U.S. waters. Yet the EPA, in enforcing the Act, currently exempts from regulation a significant source of pollution in U.S. waters: ballast-water discharges from commercial shipping vessels. Ballast water from commercial vessels is a primary vector for the introduction of exotic plant and animal species into U.S. waters. The invasion of these species poses an increasing threat to native biodiversity; the invaders prey directly on native fish and wildlife, compete for food and habitat, and introduce disease and parasites into commercial waterways. Given the severe economic and ecological consequences associated with exotic species, the lack of regulatory mandates is a critical omission in U.S. environmental law.

Ongoing debates on environmental regulation focus on the appropriate form for pollution restrictions. Specifically, the debates center on whether the use of economic tools, such as subsidies or taxation, or regulation under technology-based permit regimes is more effective in reducing pollution levels. In this article, Professor Zellmer suggests that regulation of ballast-water discharges under the Clean Water Act (CWA) would significantly reduce exotic invasions in U.S. aquatic ecosystems and is preferable to economic approaches. The article argues that the current regulatory exemption for ballast-water discharges is inconsistent with the plain language of the CWA.

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It outlines the advantages of a regulatory program and addresses the practical implications of implementing the CWA permit system in the context of ballast-water discharges.

"The success of technology-based standards in abating toxic water pollution depends largely upon one's predisposition to enjoy the donut or regret the hole."¹

I. INTRODUCTION

The invasion and establishment of nonindigenous species of animals and plants is one of the few environmental issues in the United States as yet unaddressed through federal legal controls. The lack of regulatory mandates suggests a glaring omission in U.S. environmental law. Given the severe economic and ecological consequences associated with exotic-species invasions, regulation is essential to the physical and biological integrity of U.S. land and waters. A primary source of exotic invasions in U.S. waters is ballast-water discharges from commercial shipping vessels. These discharges are largely unregulated.²

Due to the lack of regulation, U.S. aquatic ecosystems have been invaded heavily by exotic species introduced through ballast water. Some of the most affected areas include San Francisco Bay, Chesapeake Bay, New York's Finger Lakes, and the Great Lakes region. The Great Lakes have been especially hard-hit by hostile and prolific invaders like the zebra mussel. In September 1999, the International Joint Commission (IJC), comprised of Canadian and U.S. representatives, hosted a workshop to consider preventative measures to control Great Lakes' invasions, drawing upon the expertise of biologists, lawyers, and public officials. A policy-based proposal, *Exotic Policy: An IJC White Paper on Policies for the Prevention of the Invasion of the Great Lakes by Exotic Organisms*³ (*White Paper*), served as the centerpiece for discussion at the workshop.

The *White Paper* attempts to breathe new life into the perennial argument that economic initiatives, such as subsidies or taxation, are more effective than "command-and-control" regulation in preventing pollu-

1. Oliver A. Houck, *Clean Water Act and Related Programs*, SB52 A.L.I.-A.B.A. 241, 256 (1997).

2. Although the National Invasive Species Act (NISA) provides guidelines for ballast-water exchange, the guidelines are not legally enforceable. See *infra* Part II. Regulations issued by the U.S. Environmental Protection Agency (EPA) exclude ballast-water discharges from the Clean Water Act's (CWA) permit program. See *infra* Part III.

3. Eric Reeves, *Exotic Policy: An IJC White Paper on Policies for the Prevention of the Invasion of the Great Lakes by Exotic Organisms* (last modified July 15, 2000) <<http://www.ijc.org/milwaukee/wrkshps/exoticpolicy.html>> [hereinafter Reeves, *White Paper*] (on file with the *University of Illinois Law Review*). A revised version of the *White Paper* is published in *Exotic Politics: An Analysis of the Economics, Law, and Politics of Exotic Invasions of the Great Lakes*, 2 TOL. J. GREAT LAKES' L., SCI. & POL'Y 125 (2000) [hereinafter Reeves, *Exotic Politics*].

tion. Specifically, the *White Paper* concludes that economic tools are more likely to prevent the introduction of exotic species through ballast water than technology-based permit regimes.⁴ However, this article suggests instead that regulation under the Clean Water Act (CWA) would be highly effective in preventing invasions in aquatic ecosystems, at least with respect to ships traversing U.S. waters.⁵

The plain language of the CWA prohibits the discharge of contaminated water from vessels unless a permit is obtained.⁶ Regulations issued by the U.S. Environmental Protection Agency (EPA), however, exclude ballast-water discharges from the CWA's permit program.⁷ This regulatory exclusion finds no support in the statute.

The CWA asserts the ambitious goals of eliminating water pollution and protecting the chemical, physical, and biological integrity of U.S. waters.⁸ To accomplish these objectives, the discharge of any pollutant from a point source is absolutely prohibited unless authorized by permit.⁹ Point sources are generally known as discrete anthropogenic conveyances, such as industrial pipes or conduits.¹⁰ Permits for point source discharges must incorporate effluent limitations reflecting the best technology available.¹¹ Violations are redressed through the CWA's aggressive enforcement provisions, including citizen suits.¹² These provisions are superior to control efforts based on economic measures alone,¹³ and, if effectuated by the EPA in the context of ballast-water discharges, would result in marked improvement over the status quo.¹⁴

This article will first provide background regarding the effects of exotic species on aquatic ecosystems and the current legal framework governing ballast-water discharges. It will then turn, in part III, to the relevant sections of the CWA. Part IV compares the advantages of a regulatory program for preventing the introduction of exotic species to economic approaches. Finally, parts V and VI address the practical im-

4. See Reeves, *White Paper*, *supra* note 3, § 10.3.

5. As aquatic species do not respect political boundaries, introductions through ballast water in Canadian and Mexican waters can have serious effects in the United States. However, this article is limited to an assessment of U.S. domestic law, in particular, the Clean Water Act. See Clean Water Act Amendment of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (codified as amended at 33 U.S.C. §§ 1251-1387 (1994)). For a discussion of the international implications of pollution from shipping, see Barry Hart Dubner, *On the Interplay of International Law of the Sea and the Prevention of Maritime Pollution—How Far Can a State Proceed in Protecting Itself from Conflicting Norms in International Law*, 11 GEO. INT'L ENVTL. L. REV. 137 (1998). On the subject of controlling exotic species in the international law context, see David J. Bederman, *International Control of Marine "Pollution" by Exotic Species*, 18 ECOLOGY. L.Q. 677 (1991).

6. See *infra* notes 52-55 and accompanying text.

7. See 40 C.F.R. § 122.3(a)(1) (1999).

8. See Clean Water Act, 33 U.S.C. § 1251(a)(1) (1994).

9. See *id.* § 1311(a).

10. See *id.* § 1362(14).

11. See *id.* § 1311(b)(2)(A).

12. See *id.* § 1365(a).

13. See discussion *infra* Part IV.

14. See *id.*

plications of implementing the CWA permit system in the context of ballast-water discharges and possibilities for interagency and intergovernmental cooperation in enforcing discharge regulations.

II. EXOTIC SPECIES DISCHARGED WITH BALLAST WATER: EFFECTS AND CURRENT CONTROLS

Exotic species have taken a heavy toll on U.S. waters.¹⁵ Numerous scientific and legal publications provide detailed assessments of the adverse consequences of exotic invasions in the Great Lakes and other aquatic ecosystems, particularly invasions from ballast discharges.¹⁶ To set the stage for a discussion of economic and regulatory control methods, this section of the article will outline some of the most serious effects.

Exotic species have made a significant contribution to overall environmental degradation and the decline of indigenous species.¹⁷ Their invasion "poses an increasing global threat to native biodiversity, ranked second only to habitat loss."¹⁸ Some exotic invaders, like the rapacious sea lamprey (*Petromyzon marinus*), depredate directly on native fish and wildlife,¹⁹ while others cause adverse effects by competing for food and habitat and by introducing disease and parasites.²⁰ In the San Francisco Bay—an area that rivals the Great Lakes for "the dubious distinction of being the most invaded estuary in North America"—exotic species "have

15. See *infra* notes 17–31 and accompanying text.

16. See, e.g., John J. Ewel et al., *Deliberate Introductions of Species: Research Needs*, 49 BIOSCIENCE 619, 620 (1999); Brent Foster, *Pollutants Without Half-lives: The Role of Federal Environmental Laws in Controlling Ballast Water Discharges of Exotic Species*, 30 ENVTL. L. 99 (2000); David M. Whalin, *The Control of Aquatic Nuisance Nonindigenous Species*, 5 ENVTL. LAW. 65 (1998), available in WESTLAW, ENVTLAW database; David P. Eldridge, Comment, *Leviathan Lurks: Might the National Invasive Species Act of 1996 Actually Authorize Invasion by Proscribed Species?*, 6 S.C. ENVTL. L.J. 47 (1997); Glenn Zorpette, *Mussel Mayhem Continued: Apparent Benefits of Zebra Mussel Plague Are Anything But*, 275 SCI. AMERICAN 2, 22–23 (1996); Reeves, *White Paper*, *supra* note 3; see also Implementation of the National Invasive Species Act of 1996 (NISA), 64 Fed. Reg. 26,672, 26,673 (1999) (to be codified at 33 C.F.R. pt. 151) (interim rule May 17, 1999) (stating that "[a]quatic nuisance species invasions through ballast water are now recognized as a serious problem threatening global biological diversity and human health"). For additional information, see *National Sea Grant College Program* (visited Feb. 27, 2000) <<http://www.sgnis.org>>, a comprehensive on-line collection of research publications and other materials about aquatic exotic species established by the Great Lakes Sea Grant Network.

17. See Proposed Water Quality Guidance for the Great Lakes System, 58 Fed. Reg. 20,802, 20,807 (1993) (to be codified at 40 C.F.R. pts. 122, 123, 131, 132) (proposed Apr. 16, 1993).

18. Ewel et al., *supra* note 16, at 620; see also David S. Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BIOSCIENCE 607–15 (1998) (stating that exotics pose a serious threat to native species listed as federally endangered or threatened).

19. See Great Lakes Fishery Commission, *Sea Lamprey Control*, (visited Dec. 20, 1999) <<http://www.glfc.org/lampcon.htm>> (describing effects on native fishes such as lake trout, walleye, and whitefish).

20. See Eric Reeves, *Analysis of Laws & Policies Concerning Exotic Invasions of the Great Lakes: A Report to the Michigan Department of Environmental Quality*, at 8–9 (Mar. 15, 1999), available at <<http://www.deq.state.mi.us/ogl/exotic2.pdf>> [hereinafter Reeves, *Analysis of Laws & Policies*]; Zorpette, *supra* note 16, at 22–23.

overwhelmed native species and dramatically altered the bay's life cycle."²¹

Exotic species also cause a variety of economic harms, due to declining fisheries as well as structural and ecological damage. Estimates of the annual costs attributable to exotic species nationwide, both terrestrial and aquatic, range as high as \$123 billion.²² Total losses caused by only fifteen selected aquatic invaders, including the zebra mussel (*Dreissena polymorpha*) and the purple loosestrife plant (*Lythrum salicaria*), have been estimated at over \$134 billion.²³ The highly fecund zebra mussel is one of the most costly to control; national estimates range between \$3–\$5 billion a year, in large part due to the expenses incurred by power plants to clear and maintain clogged intake pipes.²⁴ The sea lamprey also causes significant losses to native fisheries, and \$10 million is spent in the Great Lakes for annual control efforts and native-fish stocking costs.²⁵

Ballast water is one of the primary vectors for the introduction of exotic species into U.S. waters subject to commercial shipping.²⁶ Vessels generally pump ballast water into tanks to replace the weight of off-

21. Mary Curtius, *San Francisco Bay: Cleaner but Still a Ways to Go*, L.A. TIMES, Sept. 10, 1998, at A1; see San Francisco Bay Project, Water Resources Division, *The History and Effects of Exotic Species in San Francisco Bay* (visited July 15, 2000) <<http://sfbay.wr.usgs.gov/access/exotic-species/exoticssp.pdf>>; Water Quality Standards for Surface Waters of the Sacramento River, San Joaquin River, and San Francisco Bay and Delta of the State of California, 60 Fed. Reg. 4664, 4665 n.3 (1995) (to be codified at 40 C.F.R. pt. 131) (stating that, due to the introduction of exotic species, as well as drought conditions and increased water diversions, the Bay/Delta has experienced a "low level of biological diversity"). The Chesapeake Bay is another water body that receives vast quantities of ballast water from almost fifty different foreign ports, but for reasons as yet unknown, the Chesapeake has not experienced infestations of exotic species to the same extent as other U.S. waterways subject to commercial vessel traffic. See Chesapeake Bay Commission, *The Introduction of Nonindigenous Species to the Chesapeake Bay Via Ballast Water* (visited Feb. 27, 2000) <<http://nas.nfrcg.gov/ballast.htm>>.

22. See Dan Fagin, *Foreign Species of Plants, Animals and Insects Endanger the Future of Our Homegrown Natural World*, NEWSDAY, Apr. 11, 1999, at A12.

23. See Sharonne O'Shea & Allegra Cangelosi, *Trojan Horses in Our Harbors: Biological Contamination from Ballast Water Discharge*, 27 U. TOL. L. REV. 381, 382–85 (1996); U.S. CONGRESS, OFFICE OF TECH. ASSESSMENT, HARMFUL NON-INDIGENOUS SPECIES IN THE UNITED STATES 6 (OTA-F-565, Sept. 1993) [hereinafter OFFICE OF TECH. ASSESSMENT].

24. See 16 U.S.C. § 4701(a)(4) (1994). The zebra mussel attaches to water pipes, thereby restricting water flow and increasing sedimentation and corrosion, resulting in significant maintenance, plant-design, and shut-down expenses. See Zorpette, *supra* note 16, at 22–23; OFFICE OF TECH. ASSESSMENT, *supra* note 23, at 67. Each adult mussel is capable of filtering a liter of water per day; as a result, the zebra mussel has increased Lake Erie's water clarity but at the same time has dramatically reduced populations of phytoplankton, the foundation of the lake's food web. See *Zebra Mussels and Other Nonindigenous Species* (visited Feb. 27, 2000) <<http://www.seagrant.wisc.edu/GreatLakes/Glnetwork/exotics.html>>.

25. See OFFICE OF TECH. ASSESSMENT, *supra* note 23, at 57. The Great Lakes Fishery Commission estimates that the Eurasian ruffe, which has become one of the most abundant fish in Lake Superior's harbors, could cause annual losses to native fisheries exceeding \$90 million by competing with native fisheries and eating critical forage. See Eldridge, *supra* note 16, at 48 n.6; 142 CONG. REC. H10,925 (daily ed. Sept. 24, 1996) (statement of Rep. Oberstar).

26. See NATIONAL RESEARCH COUNCIL, STEMMING THE TIDE: CONTROLLING INTRODUCTIONS OF NONINDIGENOUS SPECIES BY SHIPS' BALLAST WATER 11 (National Academy Press 1996) [hereinafter STEMMING THE TIDE]; Foster, *supra* note 16, at 140; Whalin, *supra* note 16, at *16; Curtius, *supra* note 21, at A1 (noting that ballast water has been responsible for introducing exotic species, particularly shellfish, to the Bay since the 1800s).

loaded cargo or expended fuel, thereby improving vessel stability in transport.²⁷ The zebra mussel is perhaps the most well publicized of the invaders attributed to ballast-water discharges. Others include the Eurasian ruffe (*Gymnocephalus cernuus*),²⁸ round goby (*Neogobius melanostomus*),²⁹ the spiny water flea (*Bythotrephes cederstroemi*) and its more recently introduced relative, the fishhook water flea (*Cercopagis pengoi*),³⁰ and even human bacterial pathogens like cholera.³¹

The discharge of ballast from commercial ships was virtually unregulated until the early 1990s, when regulations were issued pursuant to the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), as amended in 1996 by the National Invasive Species Act (NISA).³² Under NISA, vessels generally are required to exchange their ballast at sea before entering the Great Lakes.³³ As for other U.S. waters, NISA merely provides voluntary guidelines for ballast-water exchange.³⁴ The guidelines are designed to "ensure to the maximum extent

27. See STEMMING THE TIDE, *supra* note 26, at 22.

28. See Eldridge, *supra* note 16, at 47; Bederman, *supra* note 5, at 682.

29. See *Invasive Species: Sighting of Round Goby Worries Canadians*, GREENWIRE, Aug. 2, 1999, at 18. Once introduced into U.S. waters, the goby has been spread, in part, by its use as baitfish. *Id.* The introduction of the round goby may have some positive effects, as it is one of the few species that feeds on zebra mussels. See Don Zaidle, *Catch-22*, 204 OUTDOOR LIFE, Dec. 1, 1999, at 20. Although the goby may control zebra-mussel populations, it may also absorb PCBs and other toxins that mussels filtered out of the water, passing those substances along to the bass and other native fish that feed on it. See Will Elliott, *Biologists Wary as Gobies Work Their Way into W. NY Waters*, BUFF. NEWS, Nov. 14, 1999, at B14; Janet Raloff, *Invading Gobies Conquer Great Lakes*, SCI. NEWS, July 31, 1999, at 68.

30. See O'Shea & Cangelosi, *supra* note 23, at 383. The fishhook water flea was discovered in 1998 in Lake Ontario; it has since been documented in Lake Michigan and New York's Finger Lakes. See J. Raloff, *New Flea Imperils Fish, Fouls Gear*, SCI. NEWS, Nov. 13, 1999, at 308. Fifty to eighty fleas, which can fit within one square inch of space, hook together and form gelatinous masses, fouling fishing gear and devouring the plankton that larval fish need to survive. See *id.*

31. See International Maritime Organization (IMO) Ballast Water Control Guidelines, 56 Fed. Reg. 64,831, 64,831 (1991); O'Shea & Cangelosi, *supra* note 23, at 383-84 & nn.20-22 (1996) (citing, inter alia, Edward L. Mills et al., *Exotic Species in the Great Lakes: A History of Biotic Crises and Anthropogenic Introductions*, 19 J. GREAT LAKES RES. 1, 2-4 (1993)). But see Implementation of the National Invasive Species Act of 1996 (NISA), 64 Fed. Reg. 26,672, 26,674 (1999) (to be codified at 33 C.F.R. pt. 151) (interim rule May 17, 1999) (stating that, although comments submitted on the Coast Guard's interim guidelines for ballast-water management noted that cholera was detected in ballast water, there was no "conclusive evidence that linked the strain of cholera detected to the contaminated shellfish in Mobile Bay"). Other species sometimes attributed to ballast water include plants like the purple loosestrife and Eurasian water milfoil; however, these species were more likely introduced through aquariums, nurseries, or other vectors. See *id.* at 26,674; Charles K. Dayton, *A Frontal Attack on a New Menace to Minnesota Lakes*, MINNEAPOLIS-ST. PAUL STAR TRIB., July 22, 1989, at 11A.

32. 16 U.S.C. §§ 4701-4751 (1994 & Supp. III 1997); see O'Shea & Cangelosi, *supra* note 23, at 383.

33. See 16 U.S.C. § 4711. Vessels entering the Great Lakes are generally inspected at Montreal, Quebec, before they may enter the St. Lawrence Seaway and Great Lakes ports.

34. See *id.* § 4711(c); see also 33 C.F.R. § 151.2035(a) (1999) (requesting that vessels with ballast tanks take "voluntary precautions to minimize the uptake and the release of harmful aquatic organisms, pathogens, and sediments," including ballast water exchange and other management measures); Implementation of the National Invasive Species Act of 1996 (NISA), 64 Fed. Reg. at 26,672 (issuing interim guidelines for vessels operating in U.S. waters other than the Great Lakes).

practicable that aquatic nuisance species are not discharged into waters of the United States from vessels," but they are not legally enforceable.³⁵

Even in the Great Lakes, NISA does not specify federal requirements for the "purity" of ballast water released. Instead, Coast Guard regulations employ a salinity standard recommending that ballast be at least 30 parts per thousand (ppt) salt.³⁶ Although there is no evidence that 30 ppt salinity acts as an effective biocide, it presumably indicates that an ocean exchange of approximately eighty-five percent of water by volume occurred, thus flushing out species present in ballast water taken from foreign ports.³⁷ However, even if eighty-five percent were considered a reasonably adequate exchange, foreign flag vessels could enter U.S. ports with highly saline ballast water whether or not they have accomplished an ocean exchange. Ships that fill their ballast tanks in highly saline ports, such as those on the Mediterranean Sea, may have a salinity factor equal or higher than 35.3 ppt, the average salinity of the Atlantic Ocean, before they even set sail.³⁸ In addition, evaporative losses during a transoceanic voyage tend to increase salinity in the tank.³⁹ Given these variables, the salinity test provides no guarantee that an ocean exchange occurred.

There are broad-sweeping exemptions in NISA that further undermine the exchange provisions. First, exchange can be avoided on the grounds of ship safety, a determination left almost entirely to the captain's discretion.⁴⁰ Safety reasons may include "vessel architectural design" or "other extraordinary conditions."⁴¹ Accordingly, a captain who sails a poorly designed ship, or, arguably, a ship with an inexperienced crew or one sailing under a tight schedule can avoid ballast exchange. Ships that fail to accomplish an exchange outside the exclusive economic zone must employ another method of ballast-water management before entering the Great Lakes,⁴² or request the Coast Guard's permission to exchange ballast water in an alternative designated area.⁴³ The exemption sweeps even more broadly for ships traversing U.S. waters other than the Great Lakes; they may avoid exchange on safety grounds, and then proceed to discharge water "in any harbor."⁴⁴

35. 16 U.S.C. § 4711(c)(2)(A).

36. See 33 C.F.R. § 151.1510(a)(1) (1999).

37. See Reeves, *Analysis of Laws & Policies*, *supra* note 20, at 57.

38. See *id.*

39. See *id.*

40. See 16 U.S.C. § 4711(k)(1). Safety is, of course, a valid consideration, given that the pumping of ballast tanks can create hull stress due to the change in buoyancy in one or another section of the vessel during the exchange process. But "hull stress is a chronic problem, particularly with older bulk carriers—related to age, maintenance, cargo loading, and sea conditions—regardless of whether or not those vessels are required to conduct ballast exchanges." Reeves, *Analysis of Laws & Policies*, *supra* note 20, at 52.

41. 16 U.S.C. § 4711(k)(1).

42. See 33 C.F.R. § 151.1510(a) (1999).

43. See 16 U.S.C. § 4711(k)(2)(B); 33 C.F.R. § 151.1514.

44. 16 U.S.C. § 4711(k)(2)(A)–(B).

Perhaps NISA's greatest shortcoming is its failure to require treatment of residual sediments and slop in the tanks of ships fully laden with cargo, known as "no ballast on board," or NOBOB, vessels.⁴⁵ While a ship is fully loaded with cargo, the residue in a ship's ballast-water tanks is unpumpable.⁴⁶ Although residual sediments and slop can support aquatic life forms, which subsequently will be mixed with ballast water pumped into the tanks, NISA imposes no requirements on NOBOBs.

The Coast Guard has recognized that NISA is flawed and that mandatory standards could improve the quality of ballast water entering U.S. waterways. In 1998, the Coast Guard proposed a shift from the salinity test to performance standards, much like those required under pollution control statutes like the CWA.⁴⁷ Under the proposed regulations, a ninety percent exchange requirement would replace the 30 ppt salinity test; salinity, among other things, would merely provide evidence that exchange occurred.⁴⁸ However, these changes were not adopted when the interim rule issued in May 1999 "[b]ecause of strong opposition by the shipping industry."⁴⁹

Recently proposed amendments to NISA would require regulations for the treatment of ballast and NOBOB sediments entering the Great Lakes "to the maximum extent practicable . . . through the most effective and efficient techniques available, including sterilization."⁵⁰ The bill, entitled The Great Lakes Ecology Protection Act of 2000, was introduced in April 2000, and is currently pending before the House Committee on Transportation and Infrastructure.⁵¹ Although this could be a positive step toward technology-based regulation, as discussed below, the CWA addresses the problem in a more expedient and effective manner, without requiring legislative amendment.

45. See Reeves, *Analysis of Laws & Policies*, *supra* note 20, at 54–55.

46. See *id.* at 54; Implementation of the National Invasive Species Act of 1996 (NISA), 64 Fed. Reg. 26,672, 26,675 (1999) (to be codified at 33 C.F.R. pt. 151) (interim rule May 17, 1999).

47. See Implementation of the National Invasive Species Act of 1996 (NISA), 63 Fed. Reg. 17,782, 17,784–85 (1998) (to be codified at 33 C.F.R. pt. 151) (proposed April 10, 1998).

48. See Implementation of the National Invasive Species Act of 1996 (NISA), 63 Fed. Reg. at 17,785, 17,789. The Coast Guard concluded that "90 percent is a reasonable standard to set, which is of minimal cost to the industry in that it does not require any changes to current ship designs, subject to the clearly stated exemption for vessels that cannot safely conduct an exchange." *Id.* at 17,785.

49. Reeves, *White Paper*, *supra* note 3, § 7; see Implementation of the National Invasive Species Act of 1996 (NISA), 64 Fed. Reg. at 26,672. Yet the Coast Guard's stated goal remains "for owners and operators to exchange 100 percent of the original water in the ballast tank" if possible given "operating systems and physical limitations of the vessel." *Id.* at 26,677.

50. Great Lakes Ecology Protection Act of 2000, H.R. 4191, 106th Cong. (1999).

51. See *Thomas Bill Summary & Status* (visited August 28, 2000) <<http://thomas.loc.gov>>. The bill has been referred to the Subcommittee on Water Resources and Environment and the Subcommittee on Coast Guard and Maritime Transportation. See *id.* (providing status of H.R. 4191, 106th Cong. (1999)).

III. THE CWA'S APPLICATION TO BALLAST-WATER DISCHARGES FROM VESSELS

The CWA embraces the simple yet profound goal of eliminating the discharge of water pollutants.⁵² To accomplish this ambitious goal, section 301 prohibits the "discharge of any pollutant by any person" unless a National Pollution Discharge Elimination System (NPDES) permit is obtained.⁵³ This key phrase, "discharge of a pollutant," is defined, in relevant part, as "any addition of any pollutant to navigable waters from any point source."⁵⁴ Navigable waters include all surface waters of the United States, including lakes, rivers and streams, wetlands, and the territorial seas.⁵⁵

Pollutants are added to U.S. waters from a point source when ballast water containing exotic species is discharged from vessels. Yet the EPA, by regulation, has excluded ballast-water discharges from the NPDES program:

The following discharges do not require NPDES permits: (a) Any discharge of sewage from vessels, effluent from properly functioning marine engines, laundry, shower, and galley sink wastes, *or any other discharge incidental to the normal operation of a vessel*.⁵⁶

The Pacific Environmental Advocacy Center and other groups petitioned the EPA for the repeal of its regulation in January 1999.⁵⁷ In response, the EPA acknowledged that ballast water could be covered by the CWA's prohibition on point source discharges, and stated that it would prepare a report to "explore options" for regulating ballast water by September 1, 1999.⁵⁸ However, no official report or proposed rule has been issued to date. Once the EPA does make a final determination, it could be subject to a citizen suit under the CWA.⁵⁹

A. *Exotic Species Are Pollutants*

The language of the statute, as well as its objectives and legislative history, support the inclusion of exotic "pollutants" in the regulatory

52. See Clean Water Act, 33 U.S.C. § 1251(a)(1) (1994).

53. *Id.* § 1311(a), 1342.

54. *Id.* § 1362(12).

55. See *id.* § 1362(7)-(8). See generally 40 C.F.R. § 122.2 (1999) (defining "waters of the United States"); *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121 (1985) (upholding an expansive regulatory definition of navigable waters as including certain wetlands).

56. 40 C.F.R. § 122.3(a) (1999) (emphasis added).

57. See Letter from Craig N. Johnston, counsel for Pacific Environmental Advocacy Center (PEAC), et al., to Carol Browner (Jan. 13, 1999) (on file with author).

58. Letter from Charles Fox, Asst. Administrator, EPA, to Craig N. Johnston, PEAC (Apr. 6, 1999) (on file with author).

59. See 33 U.S.C. § 1365(a)(2) (1994) ("[a]ny citizen may commence a civil action . . . against the Administrator [of the EPA] where there is alleged a failure . . . to perform any act or duty under this chapter which is not discretionary with the Administrator."); see also *infra* Part IV.D. (discussing citizen suits).

program.⁶⁰ The term pollutant, as used in the CWA, means heat and a variety of substances, such as garbage, solid waste, sewage, chemical wastes, and, most importantly here, biological materials.⁶¹ Although the definition of pollutant in the CWA is not so broadly phrased as to be considered all-inclusive,⁶² courts have construed it to encompass substances not specifically enumerated but subsumed under the listed, more general terms.⁶³ Thus, fish and other organisms—alive, in various life stages, or dead—are included under the term “biological materials,” and are therefore pollutants under the CWA.⁶⁴

However, courts have deferred to the EPA’s determination that NPDES permits are not required when fish and fish parts are moved through a water body via dams because there is no “addition” of pollutants from dams: the fish do not come from the “outside world” but instead originate within the same ecosystem.⁶⁵ Similarly, the transfer of cold water from an impounded reservoir through a dam to the receiving stream or river is not considered an “addition” of a pollutant.⁶⁶ By contrast, seafood-processing plants that remove and process fish and then discharge the fish wastes into receiving waters of the United States are adding pollutants.⁶⁷

The EPA has recognized that exotic species are pollutants under the CWA section 301 and in a variety of other contexts. For example, pathogens in sewage effluent are undoubtedly biological pollutants that

60. See Whalin, *supra* note 16, at *10–12, 26–27 (reviewing legislative history of the CWA and determining that the definition of pollutants should include living aquatic invasive species); Reeves, *White Paper*, *supra* note 3, § 1 (agreeing that exotic species are pollutants, as a matter of law, economics, and common sense); see also Eldridge, *supra* note 16, at 49.

61. See 33 U.S.C. § 1362(6) (1994).

62. See *National Wildlife Fed’n v. Gorsuch*, 693 F.2d 156, 171–72 (D.C. Cir. 1982) (finding in dicta that cold, unlike heat, is a water condition; because cold is not specifically listed, while heat is a pollutant, cold is not a pollutant).

63. See *United States v. Hamel*, 551 F.2d 107, 112–13 (6th Cir. 1977) (affirming the district court’s decision that petroleum products are included under the broad term “chemical waste,” even though Congress did not list oil and oil products by name within the definition of pollutant); see also *Hudson River Fishermen’s Ass’n v. City of New York*, 751 F. Supp. 1088, 1101 (S.D.N.Y. 1990) (holding that chlorine, when discharged into navigable waters, is regarded as a pollutant, though intended for a beneficial use), *aff’d*, 940 F.2d 649 (2d Cir. 1991).

64. See *National Wildlife Fed’n v. Consumers Power Co.*, 862 F.2d 580, 583 (6th Cir. 1988); see also *United States v. Dubois*, 102 F.3d 1273, 1296–97 & n.29 (1st Cir. 1996) (finding that movement of organisms from river water to a pond is an addition of pollutants; although defendant’s snowmaking did not itself contribute new pollutants, it was undisputed that the river contained at least some pollutants not found in pond, including the parasitic *giardia lamblia*); *Association of Pacific Fisheries v. EPA*, 615 F.2d 794, 807 n.7 & 815 (9th Cir. 1980) (concluding that fish wastes discharged from seafood processors are pollutants).

65. *Consumers Power Co.*, 862 F.2d at 584–86.

66. *Gorsuch*, 693 F.2d at 161.

67. See *Association of Pacific Fisheries*, 615 F.2d at 801; 40 C.F.R. pt. 408 (1999). Along the same lines, courts have found the movement of dredged-up sediments and debris, although indigenous materials at their place of origin, adds pollutants when introduced to another area. See *United States v. M.C.C. of Florida, Inc.*, 772 F.2d 1501, 1506 (11th Cir. 1985), *vacated on other grounds*, 481 U.S. 1034 (1985), *reh’g on other grounds*, 863 F.2d 802 (1989); *United States v. Banks*, 873 F. Supp. 650, 657 (S.D. Fla. 1995).

may not be discharged into navigable waters without a permit.⁶⁸ In addition, in proposing regulations for the establishment of Total Maximum Daily Loads (TMDLs) pursuant to the CWA section 303,⁶⁹ the EPA explicitly stated that "all microbial contaminants that may be discharged to waters of the U.S. (e.g., bacteria, viruses, and other organisms) fall under the term 'biological materials.'"⁷⁰ The EPA also implicitly acknowledged that invasive species contribute to water-quality impairment within the meaning of the CWA section 303 by approving California's list of 472 impaired waters, including those listed as impaired because of the presence of invasive species.⁷¹ The Coast Guard seems to be in agreement on this point, as it has also determined that exotic species discharged with ballast water should be considered pollutants.⁷²

B. Vessels Are Point Sources

Vessels that discharge ballast water into waters of the United States are expressly included in the CWA's definition of a "point source." The term is defined broadly in section 502(14) as "any discernible, confined and discrete conveyance, including but not limited to any pipe, . . . or vessel or other floating craft, from which pollutants are or may be discharged."⁷³ The definitional section excludes only "agricultural stormwater discharges and return flows from irrigated agriculture."⁷⁴

Although an agency's construction of a statute under its administration is generally given deference, an interpretation that flies in the face of

68. See *United States v. Metropolitan Dist. Comm'n*, [1985] 16 *Env'tl. L. Rep.* (Env'tl. L. Inst.) 20,621 (D. Mass. 1985); *Upper Chattahoochee Riverkeeper Fund, Inc. v. City of Atlanta*, 986 F. Supp. 1406, 1422 (N.D. Ga. 1997); see also *United States v. Frezzo Bros., Inc.*, 461 F. Supp. 266, 269-70 (E.D. Pa. 1978) (holding that bacteria in compost runoff is a biological material and therefore a pollutant), *aff'd*, 602 F.2d 1123 (3d Cir. 1979).

69. See Clean Water Act, 33 U.S.C. § 1313(d) (1994). Section 303(d) requires the identification of impaired waters and establishment of TMDLs. See discussion *infra* Part IV.C (discussing TMDL program).

70. Proposed Revisions to the Water Quality Planning and Management Regulation, 64 Fed. Reg. 46,012, 46,017 (1999) (to be codified at 40 C.F.R. pt. 130) (proposed Aug. 23, 1999).

71. See 33 U.S.C. § 1313(d) (1994); Clean Water Act Section 303(d): Availability of List Submissions and Proposed Decisions, 63 Fed. Reg. 59,556, 59,556-57 (1998); Foster, *supra* note 16, at 120; see also L. Blaney & T. Kemp, WATER RESOURCES CONTROL BOARD, 15 CAL. REG. L. REP. 149, 150 (1995) (noting that an objective of California's plan is to reduce the impacts of introduced species on native species in the San Francisco Bay/Delta estuary); Threatened Status for Two ESUs of Steelhead in Washington, Oregon, and California, 63 Fed. Reg. 13,347, 13,356-57 (1998) (to be codified at 47 C.F.R. pt. 73) (describing the Bay/Delta accord and efforts to develop a long-term solution to water-quality problems).

72. See Implementation of the National Invasive Species Act of 1996 (NISA), 64 Fed. Reg. 26,672, 26,675 (1998) (to be codified at 33 C.F.R. pt. 151) (interim rule May 17, 1999) (stating that "anything that makes an ecosystem less suitable for an activity, or unfit for or harmful to living things is a pollutant," and concluding that nonindigenous organisms introduced through shipping activities should be considered pollutants); cf. Bederman, *supra* note 5, at 689 (concluding that exotic species should be treated as marine pollutants under various international agreements).

73. 33 U.S.C. § 1362(14) (1994) (emphasis added).

74. *Id.* A limited exemption for storm water runoff from mining activities is found elsewhere in the CWA. See *id.* § 1342(f)(2).

explicit statutory mandates, as does the EPA's regulatory exclusion of ballast water, must be set aside.⁷⁵ The EPA has met with unmitigated failure in the CWA context when it has attempted to carve out certain categories of point sources from the NPDES permit program. In *NRDC v. Costle*, the United States Court of Appeals for the D.C. Circuit invalidated the EPA's regulatory exclusion for a variety of discharges, including agricultural irrigation return flows—discharges that undoubtedly emanate from discernible conveyances—as inconsistent with the plain language of section 502(14), which at that time did not explicitly address return flows.⁷⁶ The court rejected the EPA's defense that requiring permits from agricultural activities would be difficult and expensive, stating that “technological or administrative infeasibility of [uniform national effluent] limitations may result in adjustments in the permit programs . . . but it does not authorize the Administrator to exclude the relevant point source from the NPDES program.”⁷⁷ In other words, if the discharger is a point source, only Congress can exclude it from the general prohibition of section 301; the EPA is not free to rewrite the statute.

Not only is the ballast-water regulation inconsistent with the plain language of the CWA's “point source” definition, it undermines the CWA's straightforward and ambitious objectives.⁷⁸ The CWA is intended “to restore and maintain the chemical, physical, and *biological* integrity of waters of the [United States]” by eliminating water pollution,⁷⁹ and to ensure that water quality supports fisheries and other designated uses.⁸⁰ There can be no dispute that invasive species, no less than other pollutants, have had tremendous effects on the quality and native biodiversity of U.S. waters.

75. See *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842–45 (1984) (holding that courts reviewing statutory interpretations by agencies should first determine whether the statute is ambiguous; if not, the court may not defer to the agency, but must give effect to the plain meaning of the statute); see also *Chevron U.S.A., Inc. v. Hammond*, 726 F.2d 483, 489 (9th Cir. 1984) (upholding Alaska's application of the NPDES permit system to oil-tainted ballast water discharged from vessels, and noting that the CWA provided only limited exemptions to the otherwise comprehensive NPDES program).

76. See *NRDC v. Costle*, 568 F.2d 1369, 1377–79 (D.C. Cir. 1977). Congress subsequently amended section 502(14) to explicitly exclude irrigation return flows. See 33 U.S.C. § 1362(14) (1994).

77. *Costle*, 568 F.2d at 1379.

78. See *Chevron U.S.A., Inc. v. Hammond*, 726 F.2d at 493 (finding that CWA's objectives support Alaska's application of the NPDES program to ballast water).

79. 33 U.S.C. § 1251(a) (1994) (emphasis added). A parallel provision is found in the Great Lakes Water Quality Agreement between the United States and Canada, which states that its purpose is “to restore and maintain the chemical, physical, and biological integrity of waters of the Great Lakes Basin Ecosystem.” Agreement Between the United States of America and Canada on Great Lakes Water Quality 1978, Nov. 24, 1978, as amended by the Protocol of 1987, U.S.–Can., art. II, 30 U.S.T. 1383, 1387. Although the Agreement imposes no specific requirements with respect to exotic species, Annex 6, dealing with pollution from shipping sources, calls for studies to determine if exotics in ballast-water discharges constitute a threat to the Great Lakes ecosystem. See *id.* at 1429 (annex 6). However, like the CWA, the focus of the Agreement to date has been the control of chemical contaminants, particularly toxic pollutants.

80. See 33 U.S.C. § 1251(a)(2) (1994).

Moreover, neither the legislative nor the regulatory history supports the exclusion of ballast-water discharges.⁸¹ Although the CWA's legislative history does not specifically address ballast water, it specifies that *all* discharges to waters of the United States, the contiguous zone and the ocean, "were to be regulated by EPA under one Act or the other."⁸² The Committee on Public Works and Commerce intended "complete and integrated regulation of the disposal of pollutants *into all waters and over all sources of pollutants subject to its jurisdiction*."⁸³

The regulatory history of 40 C.F.R. § 122.3 indicates that the EPA did not intend to exclude ballast-water discharges from commercial ships when the regulation was first issued in 1973. The provision as originally proposed in the federal register excluded only "discharges from properly functioning marine engines."⁸⁴ The final regulation was extended to "discharges incidental to the normal operation of a vessel," but not trash discarded overboard and discharges from vessels acting in a capacity other than transportation, "such as when a vessel is being used as a storage facility or a cannery."⁸⁵ The EPA's explanation reflects that the exclusion for incidental discharges was meant to apply to recreational boats, not commercial vessels: "This type of discharge generally causes little pollution and the exclusion of vessel wastes from the permit requirements will reduce administrative costs drastically."⁸⁶

81. See *infra* notes 82-108 and accompanying text.

82. National Pollutant Discharge Elimination System Revision of Regulations, 44 Fed. Reg. 32,853, 32,859 (1979) (citing Senate Committee on Public Works, Federal Pollution Control Act Amendments of 1971, S. REP. NO. 92-414, at 74 (1971), *reprinted in* 2 LIBRARY OF CONGRESS, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 1492 (Comm. Print compiled for the Senate Comm. on Pub. Works 1973), and referencing the CWA and the Marine Protection Research and Sanctuaries Act, 16 U.S.C. § 1431 (1994)). The Ocean Dumping Act complements the CWA with regard to discharges outside of the CWA's jurisdiction, as it prohibits vessels registered in the United States or flying a U.S. flag from transporting "any material for the purpose of dumping it into ocean waters." 33 U.S.C. § 1411(a)(2) (1994). It also prohibits any person from dumping "any material transported from a location outside the United States" into U.S. territorial seas, or the U.S. contiguous zone if it may affect U.S. territorial seas or territory, unless a permit is obtained. *Id.* § 1411(b). For discussion of the CWA's jurisdictional limitations, see *infra* note 104 and accompanying text (defining "contiguous zone" and "territorial seas").

83. National Pollutant Discharge Elimination System Revision of Regulations, 44 Fed. Reg. at 32,859 (citing Senate Committee on Public Works, Federal Pollution Control Act Amendments of 1971, S. REP. NO. 92-414, at 74 (1971), *reprinted in* 2 LIBRARY OF CONGRESS, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 1492 (Comm. Print compiled for the Senate Comm. on Pub. Works 1973) (emphasis added)).

84. National Pollutant Discharge Elimination System Revision of Regulations, 38 Fed. Reg. 1362, 1363-64 (1973) (proposed Jan. 11, 1973); see Daniel E. O'Toole, *Regulation of Navy Ship Discharges under the Clean Water Act: Have too Many Chefs Spoiled the Broth?*, 19 WM. & MARY ENVTL. L. & POL'Y REV. 1, 12-13 (1994) (discussing history of EPA's ballast-water exemption).

85. National Pollutant Discharge Elimination System, 38 Fed. Reg. 13,527, 13,530 (1973) (to be codified at 40 C.F.R. § 125.4(c)); see also National Pollutant Discharge Elimination System Revision of Regulations, 44 Fed. Reg. at 32,859 (stating that, although the CWA does not define "'vessels or other floating craft,' it appears that those terms refer to transportation vessels").

86. National Pollutant Discharge Elimination System, 38 Fed. Reg. at 13,528. The legislative history of the CWA seems to support a limited exclusion for recreational vehicles. Congress apparently believed that permitting for millions of recreational boats would be an "unreasonable expendi-

At least two other provisions of the CWA provide additional support for treating ballast discharges as point sources subject to the NPDES program. First, statutory amendments enacted in 1996 exclude incidental discharges from military vessels from the definition of pollutant.⁸⁷ At that time, Congress expressly noted that "[v]essels are point sources of pollution" under the CWA.⁸⁸ Given the operational problems experienced by the Navy when various coastal states attempted to impose inconsistent regulatory requirements or inspection programs on naval vessels,⁸⁹ Congress believed that an alternative program was desirable for the military. Thus, instead of obtaining NPDES permits to discharge their ballast water, military vessels must comply with standards of performance to be specified by regulation under another new provision, section 312(n),⁹⁰ which requires on-board, marine-pollution-control devices if such devices are reasonable and practicable.⁹¹

This exclusion provides at least some evidence that Congress intended for incidental discharges, such as ballast water, from nonmilitary vessels to be included in the NPDES program. Generally, an explicit exclusion of one activity negates an implied exclusion of another type of activity.⁹²

However, courts could view the enactment of a statutory exclusion for military vessels differently. The fact that Congress had notice that the EPA was, by regulation, excluding all ballast discharges from NPDES coverage, and had amended the relevant provisions of the CWA with respect to military discharges only, could indicate congressional approval of the EPA's regulation.⁹³ Because "the views of a subsequent

ture of administrative effort" as well as an "unreasonable burden on the individual boat owners." O'Toole, *supra* note 84, at 12-13 (citing 118 CONG. REC. 16,875-76 (1972)).

87. See Uniform National Discharge Standards for Armed Forces Vessels Act § 325(c)(3), 33 U.S.C. § 1362(6) (Supp. IV 1998).

88. S. REP. NO. 104-113, at 1 (1995).

89. See O'Toole, *supra* note 84, at 12-13 (citing S. REP. NO. 104-113, at 1, 7).

90. See Clean Water Act, 33 U.S.C. § 1322(n) (Supp. IV 1998).

91. See *id.* § 1322(n)(1), (2); 40 C.F.R. pt. 1700 (1999); see also discussion *infra* Part VI.

92. See *Andrus v. Glover Constr. Co.*, 446 U.S. 608, 618 (1980); *League to Save Lake Tahoe, Inc. v. Trounday*, 598 F.2d 1164, 1171 (9th Cir. 1979); see also *City of Chicago v. Environmental Defense Fund*, 511 U.S. 328, 338 (1994) (In refusing to imply an exemption for incinerator ash from the hazardous-waste provisions of the Resource Conservation and Recovery Act (RCRA), the Court noted that Congress had provided a complete exemption in a separate section of RCRA by utilizing a comprehensive list of relevant activities, and therefore "knew how to draft a waste stream exemption in RCRA when it wanted to"); *Chevron U.S.A., Inc. v. Hammond*, 726 F.2d at 488-90 (noting that the CWA's explicit exclusion for certain types of discharges supported inclusion of ballast water in the NPDES program).

93. See *Geldermann, Inc. v. Commodity Futures Trading Comm'n*, 836 F.2d 310, 316 (7th Cir. 1987) (holding "the congressional failure to revise or repeal the agency's interpretation is persuasive evidence that the interpretation is the one intended by Congress" and quoting *NLRB v. Bell Aerospace Co.*, 416 U.S. 267, 274-75 (1974)). Although it is not always realistic to infer approval of a judicial or administrative interpretation from congressional silence, see *Helvering v. Hallock*, 309 U.S. 106, 119-21 (1940); *Toucey v. New York Life Ins. Co.*, 314 U.S. 118, 140-41 (1941), once an agency's statutory construction has been "fully brought to the attention of the public and the Congress," and Congress has not sought to alter it although it has amended the statute in other respects, then a court may

Congress form a hazardous basis for inferring the intent of an earlier one,"⁹⁴ postenactment developments like the exclusion for military vessels cannot be given the weight of contemporaneous legislative reports or statements.⁹⁵ Even so, in determining the reasonableness of an agency's interpretation of a facially ambiguous statute, courts will not ignore authoritative congressional expressions, post hoc though they may be.⁹⁶

If a court found the CWA ambiguous on this point, a longstanding administrative interpretation like C.F.R. § 122.3 might be upheld. However, a reviewing court would be on firm legal ground if it found the definitional provisions of CWA section 502, along with the general prohibition of section 301,⁹⁷ clear and unambiguous. If so, the postenactment legislative history would merit little, if any, weight.⁹⁸ If the statute is plain on its face, courts need not resort to legislative history for confirmation, but must give the language of the statute "its natural meaning."⁹⁹ Although the EPA does have some power to define technical terms like "point source" and "pollutant,"¹⁰⁰ broad-sweeping categorical exemptions like the one for ballast discharges from commercial vessels should be rejected as inconsistent with the plain language of the CWA.¹⁰¹

The second provision that supports the inclusion of ballast-water discharges in the NPDES program is found in the CWA's definition of a "discharge of a pollutant." As discussed above,¹⁰² this section expressly includes discharges to navigable waters "from any point source"; it also

presume that the agency has correctly discerned the legislature's intent. See *Apex Hosiery Co. v. Leader*, 310 U.S. 469, 487-89 (1940).

94. *Consumer Prod. Safety Comm'n v. GTE Sylvania, Inc.*, 447 U.S. 102, 117-19 (1980) (citing *United States v. Philadelphia Nat'l Bank*, 374 U.S. 321, 348-49 (1963) and *United States v. Price*, 361 U.S. 304, 313 (1960)).

95. See *Redlark v. C.I.R.*, 141 F.3d 936, 941 (9th Cir. 1998).

96. See *North Haven Bd. of Educ. v. Bell*, 456 U.S. 512, 535 (1982); *Cannon v. University of Chicago*, 441 U.S. 677, 687 n.7 (1979); *Estate of Wallace v. Commissioner*, 965 F.2d 1038, 1050-51 n.15 (11th Cir. 1992); *McDonald v. Commissioner*, 764 F.2d 322, 336 n.25 (5th Cir. 1985). Subsequent legislative action, such as the amendment of a related statute or provision, is accorded more weight than subsequent statements. See *Bell*, 456 U.S. at 534-35; *Haig v. Agee*, 453 U.S. 280, 300-01 (1981).

97. See *Clean Water Act*, 33 U.S.C. §§ 1311(a), 1362(6), (14) (1994).

98. See *West Virginia Univ. Hosps., Inc. v. Casey*, 499 U.S. 83, 98-99 (1991) (Where a statute "contains a phrase that is unambiguous—that has a clearly accepted meaning in both legislative and judicial practice—we do not permit it to be expanded or contracted by the statements of individual legislators or committees during the course of the enactment process."); see also *United States v. Ron Pair Enters., Inc.*, 489 U.S. 235, 241 (1989) ("[W]here, as here, the statute's language is plain, 'the sole function of the court is to enforce it according to its terms.'"); *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. at 842-43 ("If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.").

99. *Morales v. Trans World Airlines, Inc.*, 504 U.S. 374, 386 n.2 (1992); see *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. at 842-83; *Harrison v. PPG Indus., Inc.*, 446 U.S. 578, 591-92 (1980). The statute itself, not committee reports or other legislative statements, provides the "authoritative expression" of the law. *City of Chicago v. Environmental Defense Fund*, 511 U.S. 328, 337-38 (1994) (holding that ash generated by resource recovery facility's incineration of municipal solid waste was subject to Resource Conservation and Recovery Act (RCRA) regulatory scheme governing hazardous waste pursuant to plain language of section 3001(i), 42 U.S.C. § 6921(i)).

100. See *National Wildlife Fed'n v. Gorsuch*, 693 F.2d 156, 167 (D.C. Cir. 1982).

101. See *NRDC v. Costle*, 568 F.2d 1369, 1375 (D.C. Cir. 1977).

102. See *supra* notes 60-72 and accompanying text.

includes discharges to the contiguous zone or the ocean "from any point source *other than a vessel or floating craft*."¹⁰³ The term "navigable waters" includes the territorial seas, which extends three miles seaward from the ordinary low-water mark, but not the contiguous zone, which is the area beyond the territorial seas.¹⁰⁴ Accordingly, by negative implication, vessels that discharge ballast to inland waters and territorial seas are in fact discharging pollutants from point sources.¹⁰⁵

Other statutes and executive materials validate this interpretation of the CWA. NISA, enacted after the CWA, states that it does "not affect or supercede any requirements or prohibitions pertaining to the discharge of ballast" under the CWA.¹⁰⁶ This generally applicable, broadly worded savings clause indicates that the CWA should apply to ballast-water discharges in United States waters.¹⁰⁷

Finally, as a matter of federal policy, Executive Order 13,112 directs the EPA and other agencies to "use relevant programs and authorities to . . . prevent the introduction of invasive species."¹⁰⁸ Thus, the EPA not only has the authority and even the mandate to regulate ballast under the CWA, but also should do so as a matter of federal prerogative. The EPA has experience and technical expertise in controlling pollution from a variety of sources. By comparison, the Coast Guard, an agency within the

103. Clean Water Act, 33 U.S.C. § 1362(12) (1994) (emphasis added).

104. The CWA defines the contiguous zone as three to twelve miles from the U.S. baseline. See *id.* § 1362(7)–(9) (defining navigable waters, territorial seas, and contiguous zone); Convention of the Territorial Sea and the Contiguous Zone, Apr. 29, 1958, art. 33, 15 U.S.T. 1606, 1612–13, 516 U.N.T.S. 205, 220–22 (defining contiguous zone as the area from three to twelve miles beyond the nation's baselines). The CWA definition incorporates the relevant international convention existing at the time of the CWA's enactment, although the more recent 1982 United Nations Convention on the Law of the Sea (UNCLOS) provides that a nation's contiguous zone may extend out to 24 nautical miles from its baselines. See *United Nations Convention on the Law of the Sea (UNCLOS)*, art. 33, U.N. Doc. A/Conf. 62/122 (1982), reprinted in 21 I.L.M. 1261, 1276 [hereinafter *UNCLOS*]. Nations may generally exercise jurisdiction over foreign flag vessels that violate its customs, fiscal, immigration, or sanitary laws if the vessels are traveling within their contiguous zone. See *id.* art. 2; see also Dubner, *supra* note 5, at 141 (noting that coastal states exercise almost exclusive jurisdiction over internal waters but cannot interfere with innocent passage of foreign vessels).

105. See cases cited *supra* note 92 (explicit exclusion of one thing negates implied exclusion of another).

106. 16 U.S.C. § 4711(b)(2)(C), (c)(2)(J) (1994).

107. The legislative history of NISA indicates that Congress wanted to ensure that the CWA continue to govern the discharge of oily or chemical-laden ballast. See Senate Environment and Public Works Committee, S. REP. NO. 101-523 on S. 2244, at 6 (1990), reprinted in 1990 U.S.C.A.N. 6455, 6460 (S. 2244 was incorporated into H.R. 5390, which was then passed into law as the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, 16 U.S.C. § 4701 (1994), amended in 1996 by the National Invasive Species Act (NISA)). However, there is no evidence that Congress intended to limit this provision to ballast contaminated with oil or chemicals. To read such a limitation into the statute would fail to do justice to the plain language of NISA's broadly phrased savings clause, in violation of the principle that the language of the statute itself, not the legislative statements, provides the "authoritative expression" of the law. *City of Chicago v. Environmental Defense Fund*, 511 U.S. 328, 337 (1994).

108. Exec. Order No. 13,112, 64 Fed. Reg. 6183, 6184 (1999).

Department of Transportation,¹⁰⁹ has a wholly different mission—safety on inland waters and territorial seas.¹¹⁰ Its responsibilities include enforcing federal laws on waters subject to the jurisdiction of the United States; protecting life and property at sea; aiding navigation through activities such as ice breaking; and maintaining readiness to function with the Navy in time of war.¹¹¹ The Coast Guard could advance the Order's directive, as well as the objectives of both the CWA and NISA, by supporting the EPA's efforts to control water pollution.

The CWA itself envisions working relationships between EPA and other agencies, even those with development-oriented missions, in other contexts. For example, the Army Corps of Engineers issues permits for dredge and fill activities that affect wetlands under section 404, while the EPA holds veto power over those permits.¹¹² The two agencies are required to jointly issue wetlands regulations.¹¹³ Although the relationship is not always an easy one,¹¹⁴ the different perspectives of the two agencies contribute to the strength of the overall program.¹¹⁵ Likewise, a cooperative arrangement between the EPA and Coast Guard would be mutually beneficial in the context of ballast-water discharges.

IV. THE EFFECTIVENESS OF REGULATORY PROGRAMS

Few would deny that the quality of surface waters in the United States has improved immensely in the past quarter-century or that significant progress has been made in cleaning up pollution from industrial

109. See 14 U.S.C. § 1 (1994). The Department of Transportation is generally known as a development-oriented department. See Oliver A. Houck, *Of Bats, Birds and B-A-T: The Convergent Evolution of Environmental Law*, 63 MISS. L.J. 403, 454 (1994).

110. See 14 U.S.C. § 2 (1994).

111. See *id.* § 2.

112. See Clean Water Act, 33 U.S.C. § 1344(c) (1994); *James City County v. EPA*, 12 F.3d 1330, 1335 (4th Cir. 1993); 40 C.F.R. § 231.1(a) (1999).

113. See *NRDC v. Callaway*, 392 F. Supp. 685, 686 (D.D.C. 1975).

114. See, e.g., *Bersani v. Robichaud*, 850 F.2d 36, 40 (2d Cir. 1988) (upholding the EPA veto of CWA section 404 permit issued by Corps). See generally Heidi Wendel, Comment, *Bersani v. EPA: Toward a Plausible Interpretation of the 404(b)(1) Guidelines for Evaluating Permit Applications for Wetland Development*, 15 COLUM. J. ENVTL. L. 99, 104–07 (1990).

115. See Benjamin H. Grumbles & Kenneth J. Kopocis, *The Water Resources Development Act of 1992: Expanding the "Corps of Environmental Engineers"*, [1993] 23 Env'tl. L. Rep. (Env'tl. L. Inst.) 10,379, 10,389 (June 1993) (noting that, in carrying out the CWA's goals, both Congress and the EPA may justifiably rely more on the Corps' expertise "in water management, wetlands protection, and other issues addressing both water quality and quantity"). "As water quality and quantity issues become increasingly linked, so too will activities of EPA and the Corps." *Id.*

point sources.¹¹⁶ Sections 301 and 402 of the CWA “deserve[] a lion’s share of the credit.”¹¹⁷

A. *The Efficacy of Regulatory Programs Versus Economic Initiatives*

In keeping with the recent hue and cry for regulatory reform,¹¹⁸ economic solutions have found favor in academia¹¹⁹ and both federal executive and legislative initiatives.¹²⁰ However, regulatory approaches

116. See Debra L. Donahue, *The Untapped Power of Clean Water Act Section 401*, 23 *ECOLOGY L.Q.* 201, 202–03 (1996); see also Brian Weeks, *Trends in Regulation of Stormwater and Nonpoint Source Pollution*, [1995] 25 *Envtl. L. Rep.* (Envtl. L. Inst.) 10,300, 10,301 (June 1995) (noting that the CWA has “drastically reduced surface water pollution from point sources”); Houck, *supra* note 109, at 417 (discussing drop in point source discharges due to the CWA).

117. William H. Rodgers, Jr., *The Seven Statutory Wonders of U.S. Environmental Law: Origins and Morphology*, 27 *LOJ. L.A. L. REV.* 1009, 1011 (1994). There are, of course, divergent viewpoints on this particular point, but those are, perhaps, more a matter of perception than of fact. As Professor Oliver Houck so aptly put it: “The success of technology-based standards in abating toxic water pollution depends largely on one’s predisposition to enjoy the donut or regret the hole.” Houck, *supra* note 1. For example, Daniel Cole & Peter Grossman make a well-reasoned argument, using extensive economic data for Clean Air Act programs, that regulatory programs in general are cost effective. See Daniel H. Cole & Peter Z. Grossman, *When is Command-and-Control Efficient? Institutions, Technology, and the Comparative Efficiency of Alternative Regulatory Regimes for Environmental Protection*, 1999 *WIS. L. REV.* 887 (1999). Curiously, they then note in passing that the costs imposed by the CWA have outweighed water-quality benefits. See *id.* at 937. The CWA’s costs were estimated at between \$25 and \$30 billion, while the range of estimated benefits varied from \$6 to \$28 billion. See *id.* at 937 n.162 (citing A. Myrick Freeman III, *Water Pollution Policy*, in *PUBLIC POLICIES FOR ENVIRONMENTAL PROTECTION* 97, 125–26 (Paul R. Portney ed., 1990)). The referenced study may understate benefits if, instead of focusing on improvements made in point source pollution reduction, it includes water-quality problems caused by nonpoint source pollution; one could well conclude that very little improvement has been made on that front. See Oliver A. Houck, *TMDLs, Are We There Yet?: The Long Road Toward Water Quality-Based Regulation Under the Clean Water Act*, [1997] 27 *Envtl. L. Rep.* (Envtl. L. Inst.) 10,391, 10,401 (Aug. 1997).

118. Regulatory reform has gained renewed interest and vigor since a Republican-controlled Congress took its seat in 1994, but it had its supporters in earlier years as well, especially during the Reagan Administration. See Thomas O. McGarity, *Regulatory Analysis and Regulatory Reform*, 65 *TEX. L. REV.* 1243 (1987); Dale B. Thompson, *Beyond Benefit-Cost Analysis: Institutional Transaction Costs and Regulation of Water Quality*, 39 *NAT. RESOURCES J.* 517 (1999). Most recently, a bill to rein in the EPA by forcing a consideration of the economic impacts of certain regulatory decisions has been introduced in the 106th Congress. See Air Quality Standard Improvement Act of 2000, 146 *CONG. REC.* S2236, S2237 (sponsored by Sen. Voinovich, R-OH).

119. See CASS R. SUNSTEIN, *AFTER THE RIGHTS REVOLUTION: RECONCEIVING THE REGULATORY STATE* 74–110 (1990); CASS R. SUNSTEIN, *FREE MARKETS AND SOCIAL JUSTICE* 276 (1997); Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 *STAN. L. REV.* 1333 (1985); Richard B. Stewart, *Models for Environmental Regulations: Central Planning Versus Market-Based Approaches*, 19 *B.C. ENVT. AFF. L. REV.* 547, 550–52 (1992); Symposium, *Free Market Environmentalism: The Role of the Market in Environmental Protection*, 15 *HARV. J.L. & PUB. POL’Y* 297 (1992).

120. See, e.g., EPA, *Regulatory Reinvention (XL) Pilot Projects*, 60 *Fed. Reg.* 27,282–83 (1995) (proposed May 23, 1995) (proposing “Project XL” to provide businesses greater flexibility in meeting environmental goals and embracing “Common Sense Initiative” to allow six industries to develop “cleaner, cheaper, smarter” approaches to regulation). The Clinton Administration has “jumped on the reinvention band-wagon by announcing several initiatives to further this goal,” including a proposal to extend compliance schedules for effluent standards for companies adopting innovative approaches for pollution prevention. Paula C. Murray, *Inching Toward Environmental Regulatory Reform—ISO 14000: Much Ado About Nothing or a Reinvention Tool?*, 37 *AM. BUS. L.J.* 35, 37 (1999) (citing BILL CLINTON & AL GORE, *REINVENTING ENVIRONMENTAL REGULATION* 43 (1995)); see also Daniel A. Farber, *Taking Slippage Seriously: Noncompliance and Creative Compliance in Environ-*

have a well-proven track record in the abatement of water pollution, and there is no reason to believe that it is time to throw out the proverbial baby with the bath water simply because "command-and-control" regulation does not always render optimal economic efficiency.

1. *Looking Back: Regulatory History and Experience*

It is often said that hindsight is twenty-twenty. Of course, taking heed of this perspective is another matter altogether.

If men could learn from history, what lessons it might teach us!
But passion and party blind our eyes, and the light which experience gives is a lantern on the stern, which shines only on the waves behind us!¹²¹

Coleridge's poetic statement illuminates the history of U.S. efforts to control water pollution, counseling against dramatic reforms. Although technology-based regulatory programs may well be imperfect,¹²² they have been an enormous on-the-ground success,¹²³ yielding measurable net benefits to society.¹²⁴ There is little doubt that the shift to technology-based controls in the Federal Water Pollution Control Amendments of 1972 resulted in significant process changes, as well as measurable pollution abatement, for the first time in years of federal involvement in water quality.¹²⁵

Prior to 1972, the federal approach was largely concentrated on providing grants to the states to encourage improvement in environmental performance. When federal funding initiatives failed to address discharges from chronic pollution sources, like publicly owned sewage-treatment plants (POTWs), the CWA was amended to limit discharges to a specified level based on the technological capacity of the category of discharger in question. For POTWs, this meant secondary treatment, along with pretreatment requirements for toxic pollutants and phased-in regulation of storm water overflows.¹²⁶ Finally, significant progress occurred.¹²⁷

mental Law, 23 HARV. ENVTL. L. REV. 297, 307 (1999) (noting that the "Clinton Administration has shown particular interest in renegotiating regulatory standards").

121. Samuel Taylor Coleridge (1831), in *THE OXFORD DICTIONARY OF QUOTATIONS* 157:20 (3d ed. 1980).

122. See ROBERT W. ADLER ET AL., *THE CLEAN WATER ACT 20 YEARS LATER* 150-70 (1993).

123. See Sidney A. Shapiro & Thomas O. McGarity, *Not So Paradoxical: The Rationale for Technology-Based Regulation*, 1991 DUKE L.J. 729, 743.

124. See Cole & Grossman, *supra* note 117, at 917-18 (assessing benefits attributable to Clean Air Act technology-based standards).

125. See Oliver A. Houck, *supra* note 109, at 418, 463; see also Shapiro & McGarity, *supra* note 123, at 746 n.96 (reporting that the CWA's initial performance standards caused "some impressive reductions in conventional pollutant discharges," citing data on reductions from pulp and paper mills from 1973 to 1984, in COUNCIL ON ENVTL. QUALITY, *ENVIRONMENTAL TRENDS* 31 (1989)).

126. See Clean Water Act, 33 U.S.C. §§ 1314(b)(2), 1317(b), 1342(p) (1994).

127. See generally Valentina O. Okaru, *Financing Publicly Owned Treatment Works and Instituting Enforcement Measures Against Non-Compliant Works Under the Clean Water Act*, 2 BUFF. ENVTL. L.J. 213 (1994). Federal funding is still a component of the POTW program, but before obtaining

This movement toward technology-based controls can best be described as the "convergent evolution" of successful environmental law: over the course of time, the job of pollution prevention selected the proper tool.¹²⁸ In the water-quality context, the NPDES permit program emerged as the proper tool. Its technology-based standards won "their primacy because other approaches simply couldn't hold their terrain."¹²⁹ By providing the necessary pressure of outside-in federal regulation, the "best available technology" (BAT) standard became "the most effective pollution-control program in the world in terms of producing identifiable abatement—short of outright bans—if only because alternative programs have proven equally burdensome and so much less effective."¹³⁰

Although in theory economic and regulatory programs appear vastly different, in implementation, the differences between well-designed, effective economic tools and regulation are not that significant. In fact, the few economic initiatives currently utilized in the United States for controlling pollution have adopted many of the features of regulatory regimes.¹³¹ The most successful market-based pollution control tool, the Clean Air Act's acid rain program for trading sulfur dioxide emissions, operates within a "command-and-control" framework where predetermined emission caps limit the operation of market forces.¹³² It also entails a substantial governmental role in overseeing trading activity and compliance with caps. And, as the Clean Air Act itself demon-

funds, "the applicant for a federal construction grant must show that its project is the most economical means of meeting effluent and water quality goals in a specific geographic area." G. Nelson Smith III, *Lawmaker as Lawbreaker: Enforcement Actions Against Municipalities for Failing to Comply with the Clean Water Act*, 41 CLEV. ST. L. REV. 685, 700-01 (1993).

128. Houck, *supra* note 109, at 407, 427-28; see also Cole & Grossman, *supra* note 117, at 894, 914-35 (describing regulatory evolution, focusing on the Clean Air Act); Samuel P. Hays, *The Future of Environmental Regulation*, 15 J.L. & COM. 549, 550 (1996) (noting the incremental nature of change in environmental regulation).

129. Houck, *supra* note 109, at 427; see Zygmunt J.B. Plater, *Environmental Law and Three Economies: Navigating a Sprawling Field of Study, Practice and Societal Governance in Which Everything is Connected to Everything Else*, 23 HARV. ENVTL. L. REV. 359, 366, 374-78, 379-82 (1999) (generally discussing historic failure of market economics to address environmental problems).

130. Oliver A. Houck, *The Regulation of Toxic Pollutants Under the Clean Water Act*, [1991] 21 ENVTL. L. REP. (ENVTL. L. INST.) 10,528, 10,541-42 (Sept. 1991); see also Houck, *supra* note 109, at 417-24 (describing gains made in the reduction of emissions going into water and other media under "best available technology" approaches currently required by various pollution-control statutes). Winston Churchill's quote about democracy as the best form of government is analogous, and can be easily adapted to describe technology-based regulation: "No one pretends that [it] is perfect or all-wise. . . . [I]t has been said that [it] is the worst form of [control] except all those other forms that have been tried from time to time." THE OXFORD DICTIONARY OF QUOTATIONS 150:19 (3d ed. 1980).

131. See David M. Driesen, *Is Emissions Trading an Economic Incentive Program?: Replacing the Command and Control/Economic Incentive Dichotomy*, 55 WASH. & LEE L. REV. 289, 293 (1998) (noting that the schism between the two is not so great as one might imagine); Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law: The Democratic Case for Market Incentives*, 13 COLUM. J. ENVTL. L. 171, 171 (1988) (describing conflict between market incentives versus regulatory bureaucracy as a false dichotomy).

132. Cole & Grossman, *supra* note 117, at 892 (citing J. CLARENCE DAVIES & JAN MAZUREK, *POLLUTION CONTROL IN THE UNITED STATES: EVALUATING THE SYSTEM* 15 (1998) (noting that "the differences between command-and-control regulations and economic instruments . . . is 'not as stark as it appears'")).

strates, whether an economic or a regulatory approach is adopted as the pollution-control methodology of choice, economic impacts and incentives will undoubtedly occur.¹³³

Yet the *White Paper* and an array of scholars and legislators criticize regulatory approaches for failing to effectuate an optimal ratio of benefits over costs. In a market-based economy such as that of the United States, economic efficiency is undoubtedly one goal of legislation.¹³⁴ Advocates of regulatory devolution go wrong, however, in their tendency to assume that economic efficiency is the *only*, or at least the most important, goal of environmental legislation. Other key values, such as sustainability, equity, environmental justice, and even a "land ethic," deserve at least as much attention.¹³⁵ Absent regulatory forces, these values tend to get side-lined when left to the marketplace.

Even if economic returns were the primary concern, existing studies do not necessarily support the argument that technology-based regulation is less efficient than market-based programs.¹³⁶ The Corporate Average Fuel Economy (CAFE) standards imposed by the Clean Air Act provide an example of a regulatory program that has been found "twice as important" as gasoline prices in stimulating automobile manufacturers to develop fuel-efficient vehicles.¹³⁷ Moreover studies have shown repeatedly that economic objectives are undermined when "free" resources like clean air and clean water are exploited.¹³⁸ The absence of regulatory

133. See *infra* Part IV.B (discussing efficacy of emission-trading programs).

134. See Plater, *supra* note 129, at 366 (noting that the marketplace is arguably "the single most dominant structure of human organization today, . . . the structure and processes of the marketplace powerfully drive the choices of what will and will not be done by all participants").

135. ALDO LEOPOLD, A SAND COUNTY ALMANAC: AND SKETCHES HERE AND THERE 201-26 (1949); MARK SAGOFF, THE ECONOMY OF THE EARTH 195-96 (1988); Marshall J. Breger et al., *Providing Economic Incentives in Environmental Regulation*, 8 YALE J. ON REG. 463, 481-82 (1991); Erwin Bulte & G.C. Van Kooten, *Economic Science, Endangered Species, and Biodiversity Loss*, 14 CONSERVATION BIOLOGY 113, 118 (2000); Shapiro & McGarity, *supra* note 123, at 743.

136. See Cole & Grossman, *supra* note 117, at 892 (describing market proponents as "ahistorical and acontextual" in their assessments).

137. *Id.* at 891-92 (citing David L. Greene, *CAFE or Price? An Analysis of the Effects of Federal Fuel Economy Regulations and Gasoline Price on New Car MPG, 1978-89*, 11 ENERGY J. 37, 37 (1990)).

138. See Garrett Hardin, *The Tragedy of the Commons*, 168 SCIENCE 1243 (1968); see also R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960) (explaining why cost externalization is a logical and powerful tendency in human behavior); Plater, *supra* note 129, at 365 (describing the "universal tendency . . . toward cost externalization"); Zygmunt J.B. Plater, *Facing a Time of Counter-Revolution—The Kepone Incident and a Review of First Principles*, 29 U. RICH. L. REV. 657, 660 (1995).

Rachel Carson showed us . . . that this tendency is dominated by short-term individualized thinking and can be quite dysfunctional in overall terms. Humans, corporations, and disparate segments of the environment are not dissociated individual islands floating in a vacuum; they live in a web of direct and indirect interconnections. Externalities go somewhere and tend to have serious accumulated consequences that can end up dwarfing the short term actions that spawned them. Then and now, however, humans and their marketplace do not voluntarily rush to take into account the negative effects of what they do, so law is necessary and inevitable.

Id. at 660 (citing RACHEL CARSON, *SILENT SPRING* (1962)).

mechanisms to internalize costs otherwise shared by the public at large inevitably leads to a "Tragedy of the Commons."¹³⁹

To the extent that excess costs do occur as a result of regulatory programs, economic initiatives, whether in the form of subsidies, taxes, or trading programs, share a variety of arguably more serious deficiencies. Such defects can sometimes be disguised, however, by the economists' failure to fully account for the institutional, political, and temporal context of the pollutant or activity of concern. Of course, both regulatory adherents and market proponents can be accused of overlooking the nuances of context in weighing alternative pollution-abatement initiatives. But market proponents have demonstrated a tendency to ignore fluctuations over time in marginal costs, societal values, technological capabilities, and governmental institutions, all of which are critical in assessing the true benefits and costs of an economic program.¹⁴⁰

For example, when pollution-control requirements are first imposed, the incremental costs of attaining environmental improvement are relatively low because the least expensive approaches are generally implemented first, resulting in the largest gains in abatement. Additional abatement increments grow more and more expensive over time, after the "quick fix" has been exhausted. Meanwhile, monitoring equipment to accurately measure pollution at the source may become more readily available, suggesting a more dire situation than previously realized. By focusing on the latter stages of a regulatory life span, market proponents can make the case that established regulatory programs are too expensive. However, over time, as abatement costs begin to rise, so do incentives to develop less-expensive new technologies.¹⁴¹ Ultimately, once improved abatement technologies and monitoring capacities are in place, more finely tuned controls are made possible, and economic initiatives may well become a feasible supplement, rather than distinct alternative, to the regulatory regime.¹⁴²

Proponents of economic approaches also tend to understate the difficulties of estimating both economic and environmental benefits and costs at any given point in the contextual spectrum.¹⁴³ Ecological costs

139. Hardin, *supra* note 138.

140. See Cole & Grossman, *supra* note 117, at 892.

141. See *id.* at 893-94; Robert W. Hahn & Robert N. Stavins, *Incentive-Based Environmental Regulation: A New Era from an Old Idea?*, 18 *ECOLOGY. L.Q.* 1, 4-15 (1991); Arnold W. Reitze, Jr., *Environmental Policy—It Is Time for a New Beginning*, 14 *COLUM. J. ENVTL. L.* 111, 113 (1989).

142. See Cole & Grossman, *supra* note 117, at 930-31, 933 (discussing development of continuous-emission monitors for electric power plants, and the subsequent success of the 1990 Clean Air Act's sulfur dioxide emissions-trading program).

143. See Shapiro & McGarity, *supra* note 123, at 735-36. Shapiro and McGarity make the case that the economists' position that the costs of "overregulation" exceed its benefits are based on "vast technical uncertainties and anchorless moral judgments reflected in the cost-benefit calculations for health and safety standards." *Id.* For example, regulatory critics argue that the vinyl chloride safety standard saves only one life per year at a cost of \$40 million. See *id.* at 731-33 (discussing J. MENDELOFF, *THE DILEMMA OF TOXIC SUBSTANCES REGULATION: HOW OVERREGULATION CAUSES UNDERREGULATION AT OSHA* 3, 22 (1988) and Cass R. Sunstein, *Administrative Substance*,

and benefits are likely to be significantly undervalued when placed within the rubric of marketplace economics.¹⁴⁴ The Department of Interior has grappled with this problem for years in promulgating regulations for the assessment of natural-resource damages. A key component of its final regulations was invalidated because its assessment methodology relied too heavily on market or "use" value of the lost or damaged resource.¹⁴⁵ The government could not show—and in fact had "made no claim"—that use value would actually pay for restoration, replacement, or acquisition of equivalent resources, as required by the Comprehensive Environmental Response, Compensation and Recovery Act (CERCLA).¹⁴⁶ Indeed, the Department "could not possibly maintain that recovering \$15 per pelt for the fur seals killed by a hazardous substance release would enable the purchase of an 'equivalent' number of fur seals."¹⁴⁷

As for costs, an economic-incentive program, whether tax-based or otherwise, could be equally, or even more, expensive than a technology-based regulatory program. The transaction costs and information costs associated with market-based initiatives tend to be relatively high.¹⁴⁸ In addition, monitoring and enforcement costs may be higher, as economic approaches provide incentives to hide emissions to avoid pollution taxes or maximize subsidies.¹⁴⁹ Inspectors would be required to monitor the amount of pollution emitted from all possible discharge points on an aggressive and continuous basis to assess the appropriate amount of a pollution tax or subsidy, an expensive and labor-intensive endeavor.¹⁵⁰ Conversely, regulatory strategies are generally less expensive to monitor and enforce because inspectors need only determine whether the discharge at the discharge point meets the BAT-based effluent limitations or, in the case of performance standards, whether the required technology has been installed and is being properly operated.¹⁵¹

1991 DUKE L.J. 607, 629–30). Shapiro and McGarity respond that this calculation is based on extremely limited risk-assessment tools. *See id.* at 733–35. It fails to account for the regulation's numerous benefits other than saving lives (e.g., the mental and emotional well-being attendant to maintaining a productive workforce free of nonfatal diseases), and is based on a willingness-to-pay model defined by the wage received for working in dangerous conditions, discounting the fact that many workers simply cannot pay. *See id.*

144. *See* Plater, *supra* note 129, at 374–77, 379.

145. *See* *Ohio v. United States Dep't of the Interior*, 880 F.2d 432, 433 (D.C. Cir. 1989).

146. 42 U.S.C. § 9607(f)(1) (1994).

147. *Ohio v. United States Dep't of the Interior*, 880 F.2d at 445.

148. *See* Cole & Grossman, *supra* note 117, at 890–92.

149. *See* Shapiro & McGarity, *supra* note 123, at 749.

150. *See id.*

151. *See* Cole & Grossman, *supra* note 117, at 918–19 (finding that monitoring and enforcement costs tend to be higher for market-based programs). The CWA gives the EPA explicit authority to impose record-keeping, sampling, and reporting requirements, and to inspect and gather data on the premises, *see* Clean Water Act, 33 U.S.C. § 1318(a) (1994), thus keeping enforcement costs lower than might otherwise be the case. *See generally* Howard Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267,

2. *Looking Forward: Regulatory Staying Power and Innovation*

Perhaps the predominant criticism of regulatory programs is that establishing emission levels based on current technology squelches future innovation. It stands to reason that industry would be reluctant to invest in the research and development of new control methods when it knows that operational costs will increase as the BAT standard is ratcheted up.¹⁵² Although this is a legitimate concern, there is another side to the story.

[O]stensibly cost-blind standards can help stimulate the development of improved pollution control technology. . . . Regulations that confront industry with the prospect of substantial compliance costs create greater incentives for the development of cheaper control technology. Time and time again, after regulations have gone into effect, regulatory targets have proven able to do what they previously claimed was impossible when they were seeking to forestall the regulations. A study of industrial responses to regulation found that the stringency of regulation was "the most important factor influencing technological innovation."¹⁵³

Moreover, polluters themselves are not the only potential source of pollution-control innovations. As a case in point, the new source-performance standards required by the 1970 Clean Air Act resulted in the dramatic growth of independent environmental industries, who raced to invent "green" technologies in hopes of capturing emerging new markets.¹⁵⁴

In comparison, economic incentives, such as subsidies or taxation, do not necessarily stimulate environmental improvement and may even result in fewer emission-reducing innovations than regulatory controls.¹⁵⁵ Economic subsidies—actions that provide commodities, capital, or services at below market cost—are especially unlikely to encourage technological advancement. Certainly, subsidies can be appropriate to redress a

1270–71 (1985) (concluding that regulatory programs result in decreased costs for information collection and evaluation, and greater consistency and predictability of results).

152. See Daniel J. Dudek & John Palmisano, *Emissions Trading: Why is This Thoroughbred Hobbled?*, 13 COLUM. J. ENVTL. L. 217, 234–36 (1988); see also RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 279 (2d ed. 1977); Reeves, *White Paper*, *supra* note 3, § 10.3 (quoting a vice president of Chrysler, discussing achievable technology for reducing emissions, "We're all worried that if we sound hopeful, what will the damned standards be tomorrow?").

153. Robert V. Percival, *Regulatory Evolution and the Future of Environmental Policy*, 1997 U. CHI. LEGAL F. 159, 179 (1997) (citing Nicholas A. Ashford, *Understanding Technological Responses of Industrial Firms to Environmental Problems: Implications for Government Policy*, in ENVIRONMENTAL STRATEGIES FOR INDUSTRY 282 (Kurt Fischer & Johan Schot, eds., Island 1993)).

154. See Cole & Grossman, *supra* note 117, at 911 n.56 (citing Robert Repetto, *Air Quality Under the Clean Air Act*, in INCENTIVES FOR ENVIRONMENTAL PROTECTION 221, 276–77 (Thomas C. Schelling ed., 1983)). In 1996, the U.S. environmental-technologies industry "produced \$436 billion in global revenues and employed 1.3 million people." *Id.* (citing U.S. DEP'T OF COMMERCE, ENVIRONMENTAL INDUSTRY OF THE UNITED STATES: OVERVIEW BY STATE AND METROPOLITAN STATISTICAL AREA 1 (Oct. 1997)).

155. See David M. Driesen, *supra* note 131, at 294.

private-market failure, as in mass transit, or where public needs would otherwise go unmet, as in parks, the arts, and occasionally, scientific research.¹⁵⁶ Finely tuned subsidies to private-sector industry may even be unobjectionable if necessary to maintain community stability or advance other legitimate public policies.¹⁵⁷ Government support for various New Deal programs during the Great Depression, for example, made sense given the need to promote economic development, increase employment and overall living conditions, and protect or restore natural resources in the face of dust-bowl conditions.¹⁵⁸ Similarly, the "Swamp Buster" provisions of various federal farm bills, mandating cuts in existing subsidies for farmers who convert wetlands to crop production,¹⁵⁹ have had beneficial environmental effects, likely because land-use controls are otherwise so difficult to regulate at the federal level.¹⁶⁰

Governmental programs aimed at supporting the economic position of particular industries must be subject to constant reevaluation to ensure continued efficacy in light of changing circumstances. Economic supports should be designed in a way that ultimately eliminates the need for their continued existence.¹⁶¹ In the case of contaminated ballast-water discharges, where industry is externalizing pollution-control costs and imposing them on the general public, subsidies are most likely not appropriate at all.¹⁶² Even those who laud incentive-based instruments as the method of choice for controlling pollution generally agree that subsidies are an inefficient tool for achieving environmental quality because the resulting reductions in operational costs can attract new entrants and

156. See CHARLES F. WILKINSON, *CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST* 19 (1992).

157. See *id.*

158. See WILLIAM E. LEUCHTENBURG, *FRANKLIN D. ROOSEVELT AND THE NEW DEAL* 157–58, 172–73 (Harper Paperback 1963) (discussing soil conservation measures and the Rural Electrification Administration); David A. Taylor, *A Noble and Absurd Undertaking*, 30 *SMITHSONIAN* 100, 108 (2000) (by supporting authors like Richard Wright, Studs Terkel, and Margaret Walker, the Works Progress Administration federal writers' project "fostered 'what nobody believed was possible at that time—a renaissance of the arts and American culture'").

159. See, e.g., 16 U.S.C. § 3821 (1994).

160. See Oliver Houck, *TMDLs IV: The Final Frontier*, [1999] 29 *Envtl. L. Rep.* (Envtl. L. Inst.) 10,469, 10,483 (Aug. 1999) (noting success of swamp buster programs); Linda A. Malone, *Reflections on the Jeffersonian Ideal of an Agrarian Democracy and the Emergence of an Agricultural and Environmental Ethic in the 1990 Farm Bill*, 12 *STAN. ENVTL. L.J.* 3 (1993) (describing conservation programs).

161. See WILKINSON, *supra* note 156, at 19 (citing U.S. CONG., JOINT ECON. COMM., 89TH CONG., 1ST SESS., *SUBSIDY AND SUBSIDY-EFFECT PROGRAMS OF THE U.S. GOVERNMENT* 1 (Comm. Print 1965)).

162. Subsidizing the shipping industry for abating discharges of contaminated ballast water is all the more inappropriate in the Great Lakes because, as noted in the *White Paper*, the Great Lakes shipping industry is already subsidized as a result of the initial and ongoing government support for the construction and maintenance of the Saint Lawrence Seaway. See Reeves, *White Paper*, *supra* note 3, § 10. The implications of any form of pollution abatement subsidy would require detailed economic assessment and consistent monitoring throughout implementation to determine the extent of synergistic or unintended effects.

greater investments in the polluting industry, creating perverse incentives for the industry to increase overall net emissions.¹⁶³

Likewise, taxation, although held in "nearly reverential regard" by proponents of economic initiatives for accomplishing environmental quality,¹⁶⁴ is not without problems and would not necessarily stimulate rapid innovations. Assuming that a ballast-water tax applied to foreign vessels is allowed by international trade agreements,¹⁶⁵ the tax rate itself would need to be reevaluated almost continually to ensure that it is set at an appropriate and effective level. Because there is virtually no way to calculate with precision exactly how much abatement will result from any given pollution tax, rates must be adjusted over time to meet abatement goals.¹⁶⁶ Yet, legislatures are historically unwilling to revise tax rates after they are initially set.¹⁶⁷ "[T]he current income tax system, with its monument to the ingenuity of tax avoidance, does not inspire optimism on this point."¹⁶⁸

During the time it takes for the taxation system to reach "steady state," proceedings to establish or adjust a tax rate will be highly contentious and time-consuming (that is, unless society is willing to tolerate high exposure levels in the interim).¹⁶⁹ Industry tends to resist any change to status quo, both because change typically requires immediate capital outlays and because it results in devaluation of existing expertise within firms.¹⁷⁰ As a result, implementation of a pollution tax is likely to be far slower than aggressive implementation of the current regulatory scheme.¹⁷¹ Given the existing uncertainties about the presence, potential for entry, and severity of effects of the next aquatic invader, the added

163. See Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 726-27 (1999) (citing WILLIAM J. BAUMOL & WALLACE E. OATES, *THE THEORY OF ENVIRONMENTAL POLICY* 211-28 (2d ed. 1988) (1975)). In addition, "compensating risk-makers for their costs of abatement (under subsidies) will induce risk-makers to make more risk." *Id.* at 726 n.186.

164. *Id.* at 727 (citing Frank S. Arnold, *The Economist's Perspective: Why There Are No Pollution Taxes*, ENVTL. F., Mar.-Apr. 1998, at 14).

165. See, e.g., General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, T.I.A.S. 1700, 55 U.N.T.S. 308, art. III. See generally Robert Charles Griffiths, Note, *Broadening the States' Power to Tax Foreign Multinational Corporations*: Barclays Bank v. Franchise Tax Board, 46 CATH. U. L. REV. 243 (1996).

166. See Shapiro & McGarity, *supra* note 123, at 748.

167. See *id.*

168. *Id.* at 749.

169. *Id.* at 745.

170. See Cole & Grossman, *supra* note 117, at 924, 926. In fact, although the United States has embraced emissions trading as a supplemental tool to control air emissions, there are no environmental taxes in place, perhaps because organized special interests (industry) have strenuously resisted the idea. See David M. Driesen, *Choosing Environmental Instruments in a Transnational Context*, 27 ECOLOGY L.Q. 1, 45 (2000) (explaining avoidance of taxation schemes through public-choice political theory).

171. See Shapiro & McGarity, *supra* note 123, at 744-45.

uncertainty as to the appropriate level of taxes, along with the attendant delays of shifting to a new program, may well be intolerable.¹⁷²

In contrast, regulatory requirements that force the adoption of improved technology will result in timely emission reduction, and perhaps even greater efficiency and lower costs.¹⁷³ The best performers will not necessarily be disadvantaged by technology-based effluent limitations. The CWA's NPDES program can actually level the playing field for companies that implement technological controls, because all facilities within an industrial class are required to meet a minimum threshold of "cleanliness."¹⁷⁴ Facilities that improve their environmental image by adopting innovations in technology could gain competitive advantage if their "green" reputation is touted through effective marketing and public relations efforts.¹⁷⁵ Meanwhile, uniform standards decrease the likelihood of social dislocation and "forum shopping" that can otherwise result in competitive disadvantages between geographical regions or between firms in regulated industries.¹⁷⁶ At the very least, over the years "the BAT process has proven, against vigorous opposition and the most dire predictions, that pollution could in fact be reduced without significant losses in employment, competitiveness, control, or industrial growth."¹⁷⁷

Implementation of the Clean Air Act has demonstrated that, although industry routinely overestimates compliance costs, it subsequently achieves legislative goals without a loss in its ability to compete. For example, the oil industry claimed that phasing out lead in gasoline would cost ninety-five percent more than it actually did.¹⁷⁸ Similarly, pes-

172. See *id.* at 745. The *White Paper* itself acknowledges that its conclusions raise "some highly complex questions about the synergistic interaction of taxes, subsidies, and regulatory costs in various competing segments of industry which are beyond the analysis I can present here." Reeves, *White Paper*, *supra* note 3, § 10.3.

173. See Wendy E. Wagner, *The Triumph of Technology-Based Standards*, 2000 U. ILL. L. REV. 83, 94-100 (describing expeditious and efficacious nature of environmental technology-based standards); Houck, *supra* note 109, at 430 (noting that requirements for alternative technology, including even outright bans of harmful substances, e.g., leaded gasoline and DDT, can force industry to find alternative means of production or alternative, less-destructive products and, in doing so, save money as well).

174. See Reeves, *Exotic Politics*, *supra* note 3, at 192 (noting that the shipping industry asked the Vancouver Harbour Master to issue a standing order making a voluntary ballast-exchange initiative into a mandatory program); Reeves, *White Paper*, *supra* note 3, § 7.4.

175. Cf. Wagner, *supra* note 173, at 108-09 (describing competitive advantages for existing sources that engineer the development of improved technologies).

176. See Latin, *supra* note 151, at 1270-71; see also *NRDC v. Costle*, 568 F.2d 1369, 1377 (D.C. Cir. 1977) (effluent limitations imposed by NPDES permits impose minimum, uniform floors below which neither individual nor jurisdictional efforts may sink, thereby avoiding the "race to the bottom" that would otherwise result among jurisdictions with different requirements).

177. Oliver A. Houck, *The Regulation of Toxic Pollutants Under the Clean Water Act*, [1991] 21 *Env'tl. L. Rep.* (Env'tl. L. Inst.) 10,528, 10,541-42 (Sept. 1991).

178. See Alan S. Miller, *Environmental Regulation, Technological Innovation, and Technology-Forcing*, 10 NAT. RESOURCES & ENV'T, Fall 1995, at 64, 67; Percival, *supra* note 153, at 168-70. Ironically, although Nixon's proposal for a stiff tax on lead additives in 1971 to encourage their phase-out was given short shrift by Congress at the time, the subsequent inclusion of mandatory lead phase-out

simistic estimates of the costs of the acid rain program adopted in the 1990 Clean Air Act amendments were overstated by almost fifty percent, as emissions trading and regulatory restrictions encouraged the use of low-sulfur western coal and scrubbers, and utilities responded favorably to rewards for conservation and renewable energy.¹⁷⁹ Also as a result of the 1990 amendments, ozone-depleting CFCs were phased-out, and ozone-friendly substitutes became more readily available.¹⁸⁰

Regulatory programs often are accused of rewarding older, dirtier plants through "grandfather" provisions, providing them with an incentive to continue relatively cheap operations while placing new technologies and firms at a disadvantage.¹⁸¹ Although stringent, the CWA's provisions for new sources do not necessarily inhibit new construction. The CWA does not mandate the creation of new technology out of whole cloth, but simply requires new sources to adopt the best technologies already demonstrated for use by the industry in question.¹⁸² Once the applicable standard is applied to the new source, that source will not be subjected to more stringent standards of performance during the ten-year period following completion of construction, or depreciation or amortization of the facility, whichever date is earlier.¹⁸³ Thus, the new source requirement is unlikely to put most shippers in economic jeopardy, assuming they had economically viable operations in the first place.¹⁸⁴ Meanwhile, the effluent limitations for existing sources are to be

in the Clean Air Act is now described as "the singular success story in air pollution control." *Id.* at 168.

179. See Percival, *supra* note 153, at 168–70. The 1990 amendments to the Clean Air Act gave the EPA authority to stimulate and support a market in emission allowances by conducting auctions of those allowances. The allowance price for the EPA auction was set at \$1,500 per ton. See Auctions, Direct Sales and Independent Power Producers Written Guarantee Regulations, 56 Fed. Reg. 65,592 (1991); see also 42 U.S.C. § 7651c tbl. A (Affected Sources and Units in Phase I and Their Sulphur Dioxide Allowances). At the time of enactment, industrial economists projected that the "cost" of sulfur dioxide allowances would be up to \$700 per ton. See *New Strategies for a New Market: The Electric Industry's Response to the Environmental Protection Agency's Sulfur Dioxide Emission Allowance Trading Program*, 47 ADMIN. L. REV. 469, 475 (1995). When trading began, the actual cost turned out to be around \$150 per ton. See *id.* It was predicted that, as "industry develops and becomes more competitive, however, utilities will have no choice but to adopt cost-effective and economically efficient policies. . . . [As a result], the demand for emission allowances will increase and a strong and active trading market will emerge." *Id.* at 491.

180. See Percival, *supra* note 153, at 168–70.

181. See Ackerman & Stewart, *supra* note 131, at 174 n.5 (citing sources regarding differential treatment of old and new facilities); Richard B. Stewart, *Controlling Environmental Risks Through Economic Incentives*, 13 COLUM. J. ENVTL. L. 153, 158 (1988) (arguing that the more stringent treatment of new sources encourages existing sources to prolong their design lives and discourages new sources, with state-of-the-art water pollution technology, from entering the market); Reeves, *White Paper*, *supra* note 3, § 10.

182. See Clean Water Act, 33 U.S.C. § 1316(b)(1)(B) (1994) (requiring best available demonstrated technology (BAT)).

183. See 33 U.S.C. § 1316(d) (1994).

184. See Shapiro & McGarity, *supra* note 123, at 744 n.80 (reaching similar conclusion with respect to the BAT standard applied to existing sources). Perhaps in recognition of the potential for stringent BAT standards to create incentives to keep older, dirtier facilities operating, the EPA has, on occasion, attempted to set BAT for new sources no higher than BAT, but these efforts have met

reviewed and revised every five years, so that improvements in technology will eventually find their way into the BAT standards for existing sources.¹⁸⁵ Existing sources could be forced to retire if they cannot meet revised technology-based effluent limitations.

Without question, the statutory regime could do a better job of encouraging innovation and phasing out the oldest, dirtiest dischargers. The BAT review and revision process, which has been bogged down with the weight of industry resistance and litigation from both sides,¹⁸⁶ could be enhanced in several ways. The EPA needs to obtain and devote more resources to move the process along, while building a strong, defensible administrative record for improved standards. In addition, the agency could offer incentives to existing facilities that adopt cleaner technologies, and encourage them to share that technology with other facilities, through competitive grants or finely focused short-term subsidies.

Alternatively, legislative amendments could be adopted to encourage emissions and technology trading,¹⁸⁷ or to explicitly phase-out old vessels that refuse to retrofit or treat their ballast water to the greatest degree allowed by advances in technology. Congress in recent years has been able to design at least one technology-based regulatory regime that has encouraged new sources to implement new technology, while phasing out old, dirty facilities. The Oil Pollution Act (OPA) of 1990 imposes, over a period of twenty years, a double-hull requirement for existing vessels starting with the oldest, largest vessels. It also requires double hulls for all new vessels built for oil transportation when they operate in U.S. waters or the U.S. exclusive economic zone.¹⁸⁸

The OPA has spurred active competition among naval architects to build a safer supertanker, and the world's first double-hull supertanker was completed in Denmark in 1992.¹⁸⁹ Since the OPA was enacted, significant declines in oil spills, both in number of incidents and amounts

with judicial disapproval. See Houck, *supra* note 109, at 463 (discussing litigation and reversal of petrochemical industrial standards, in Chemical Mfrs. Ass'n v. EPA, 883 F.2d 253 (5th Cir. 1989)).

185. See 33 U.S.C. § 1311(d) (1994).

186. See Houck, *supra* note 109, at 456 & n.240-41. Another potential "loophole" for existing sources is found in CWA section 301(c), which allows modification from uniform effluent limitations for a variety of reasons, including the facility's "economic capability." 33 U.S.C. § 1311(c).

187. See Natalie M. Derzko, *Using Intellectual Property Law and Regulatory Processes to Foster the Innovation and Diffusion of Environmental Technologies*, 20 HARV. ENVTL. L. REV. 3, 30-32 (1996). For discussion of emissions-trading programs, see *infra* Part IV.B.

188. See 46 U.S.C. § 3703(a) (1994); Double Hull Standards for Vessels Carrying Oil in Bulk, 57 Fed. Reg. 36,222 (1992) (codified at 33 C.F.R. pts. 155, 157, 46 C.F.R. pts. 30, 32, 70, 90, 172). For existing vessels, the double-hull requirement is phased in over several years, depending upon the size and age of the vessel, beginning in 1995, and proceeding in stages until 2010, when all vessels over 5000 gross tons must be equipped with double hulls. See Jeffery D. Morgan, *The Oil Pollution Act of 1990: A Look at Its Impact on the Oil Industry*, 6 FORDHAM ENVTL. L.J. 1, 7 (1994).

189. See ROBERT V. PERCIVAL, *ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY* 145 (2d ed. 1996) (citing Richard L. Hudson, *Tanker Safety Plans are Muddled as Oil Spill Threatens Shetlands*, WALL ST. J., Jan. 8, 1993, at A7B).

spilled, have occurred,¹⁹⁰ and although freight rates increased by approximately ten percent,¹⁹¹ the flow of oil being shipped to the United States has continued with no significant interruptions.¹⁹² Attesting to the OPA's efficacy, the International Maritime Organization has followed suit by adopting regulations that will require double hulls or equivalent safety features for all new oil tankers.¹⁹³

B. Supplementing Regulation with Economic Incentives

Once regulations are in place, technological improvement could be encouraged through supplemental market-based tools.¹⁹⁴ The emissions trading program of the 1990 Clean Air Act, for example, has enjoyed success not by replacing national air-quality standards, but by providing flexibility in reaching predetermined goals—the permissible levels of exposure already set by the Act.¹⁹⁵

Emissions-trading programs authorize polluters to receive and exchange permits, which allow a certain amount of pollution emission. Permit recipients have several choices: they may emit only the amount of pollution allowed by the permit; they may buy additional permits to emit more than would otherwise be allowed; or they may reduce emissions and sell excess permit allowances. As a result, polluters that can

190. The Coast Guard reported the following data for U.S. waters: 1991—three spills totaling 55,000 gallons (the lowest level in 14 years); 1992—1 spill at 98,700 gallons; 1993—1 spill releasing 33,500 gallons; 1994—1 spill at 35,700 gallons. *See id.* at 144.

191. *See id.* at 143.

192. *See id.* at 145 (citing Reuters, *Oil Supplies Unaffected by Tanker Rules*, N.Y. TIMES, Dec. 29, 1994, at D4). Up until late 1999—early 2000, oil prices were the lowest seen in decades. *See Continuing Decline in Oil Prices Benefits Consumers and a Wide Range of Industries*, WALL ST. J., Dec. 2, 1998, at A2; Jeffrey Ball, *Gasoline Price Rise Worries Auto Makers*, WALL ST. J., Dec. 8, 1999, at A2 (reporting that, although oil prices rose somewhat during fall 1999, “[r]etail prices, adjusted for inflation, fell to their lowest level last year since pump prices began to be tracked in 1918, according to the American Petroleum Institute”). Crude oil prices have increased throughout 2000, due in part to high consumer demand spurred by a strong economy, and to new federal mandates for cleaner-burning gasoline. *See Alexei Barrionuevo, New Environmental Rules and Production Worries Create Shortage Fears*, WALL ST. J., May 16, 2000, at A2.

193. *See* PERCIVAL, *supra* note 189, at 145.

194. *See* Houck, *supra* note 109, at 427–31, 454 nn.226–28.

195. *See* Clean Air Act, 42 U.S.C. § 7651b (1994). Under Title IV of the Clean Air Act Amendments of 1990, annual emissions of sulfur dioxide, which, together with nitrogen oxide, contributes to acid rain, must be reduced by 10 million tons by 2010. *See id.*; Theodore L. Garrett & Sonya D. Winner, *A Clean Air Act Primer: Part II*, [1992] 22 Env'tl. L. Rep. (Env'tl. L. Inst.) 10,235, 10,253–56 (Apr. 1992). Title IV provides that pollution allowances may be allocated to fossil-fuel, electric-utility generating units, based on the utility's past emissions and fuel consumption. *See* Garrett & Winner, *supra*. Allowances over and above those needed for operation may be traded to other utilities, all the while moving toward the overall emission goal. Tradable excess allowances may be obtained by abating more than required by law or by implementing conservation plans, e.g., use of renewable energy sources. *See id.* For a discussion of the effectiveness of Title IV in reducing interstate air pollution, *see Acid Rain: Sulfur Dioxide Emissions Drop 17 Percent in 1990–98 Period*, GAO Report Indicates, 31 Env't Rep. (BNA) 577 (2000); Cole & Grossman, *supra* note 117, at 930–33; Dallas Burtraw & Byron Swift, *A New Standard of Performance: An Analysis of the Clean Air Act's Acid Rain Program*, [1996] 26 Env'tl. L. Rep. (Env'tl. L. Inst.) 10,411 (Aug. 1996); Eileen L. Kahaner, GAO's Analysis of Title IV's Sulfur Dioxide Emissions Allowance Trading Program, 2 ENVTL. LAW. 239, 251 (1995).

reduce emissions most cheaply will sell extra allowances to those who face higher abatement costs, thereby achieving economic efficiency.¹⁹⁶

Trading initiatives in general are cost effective only in situations where regulated facilities face different marginal control costs, and where reductions can be made more cheaply by some individual facilities than by others.¹⁹⁷ Although many categories of facilities and vessels subject to the CWA may meet this criteria, it is not clear that existing law allows trading as a supplement to the NPDES program, or that such a program would be an effective tool for addressing ballast-water discharges.

Unlike the Clean Air Act, the CWA does not explicitly authorize effluent-trading programs.¹⁹⁸ The EPA, however, construes the CWA to allow dischargers to trade waste load allocations as a means to implement the TMDL program for meeting water-quality standards.¹⁹⁹ The Clinton administration's 1994 "Clean Water Initiative" lends its support to trading programs, and recommends that the EPA study trading opportunities and publish additional guidance regarding possible pollutant trades.²⁰⁰

Although emissions trading may well be a viable option for meeting water-quality objectives through TMDLs, the NPDES program is less amenable to trading. The TMDL requirement provides a relatively close parallel to the Clean Air Act approach, by focusing on the achievement

196. See Jeffrey M. Hirsch, *Emissions Allowance Trading Under the Clean Air Act: A Model for Future Environmental Regulations?*, 7 N.Y.U. ENVTL. L.J. 352, 355 (1999).

197. See Alexandra Teitz, Note, *Assessing Point Source Discharge Permit Trading: Case Study in Controlling Selenium Discharges to the San Francisco Bay Estuary*, 21 ECOLOGY L.Q. 79, 81-82 (1994) (noting that these factors allow a market to develop, but that transaction costs can "impose trading barriers and reduce realizable cost savings"). For an interesting comparison of the costs of Germany's effluent-trading system with the costs associated with the CWA's technology-based requirements, see Thompson, *supra* note 118, at 538-39 (concluding that, depending on certain variables, including how much industry spends to lobby Congress and the regulators, effluent trading may be more cost-effective).

198. See Elise M. Fulstone, *Effluent Trading: Legal Constraints on the Implementation of Market-Based Effluent Trading Programs Under the Clean Water Act*, 1 ENVTL. LAW. 459, 480-89 (1995) (concluding that CWA amendment might be necessary before such trading would be allowed, citing, e.g., the antibacksliding provisions of 33 U.S.C. § 1342(o)); see also Teitz, *supra* note 197, at 108, 152 (concluding that CWA section 402(a)-(b), which require NPDES permits to specify effluent limitations unless elaborate modification procedures are met, "may significantly constrain the trading options currently available"). Fulstone recommends that Congress enact a variance from the CWA's technology-based requirements for participants in qualified point source trading programs. See Fulstone, *supra*, at 489.

199. See U.S. EPA, GUIDANCE FOR WATER QUALITY-BASED DECISIONS: THE TMDL PROCESS 51 (EPA 440/4-91-001 Apr. 1991); see also Clean Water Act, 33 U.S.C. § 1313(d)(4)(A) (1994) (effluent limitations based on TMDL may be revised if the water-quality standards will still be attained).

200. See U.S. EPA, President Clinton's Clean Water Initiative 66-69 (EPA 800-R-94-001) (Feb. 1994) <<http://www.cleanwater.gov/>>; Clean Water Act Plan, 63 Fed. Reg. 14,109 (1998). The Clean Water Initiative states that the EPA should: "(1) 'establish criteria . . . for prior approval of trades by' the permitting and administering authorities; (2) 'specify that trades [may] not violate water quality standards'; (3) 'specify that . . . trades based on TMDLs may . . . take place' even though water-quality standards have not been met; "(4) identify settings, based on models, that may complement trading programs when on-site monitoring would be otherwise prohibitively expensive; (5) 'clarify that the CWA's anti-backsliding provision . . . does not prohibit trading'; and (6) authorize pretreatment trading programs." Fulstone, *supra* note 198, at 462 n.8.

of ambient levels of "clean" water.²⁰¹ In contrast, each individual point source must meet the technology-based effluent limitation applicable to its industrial category under the NPDES program, regardless of the quality of the receiving water body, and NPDES permits generally cannot be revised to contain less stringent standards under the antibacksliding provisions of the CWA.²⁰²

Even if effluent trading could be used in tandem with the NPDES program, it is not necessarily a desirable tool for regulating ballast-water discharges. Trading programs are not particularly useful when the goal is to achieve zero discharge;²⁰³ there would be nothing left to trade. In addition, tradable emission permits can exacerbate barriers to market access by new vessels and facilities and enhance the competitive edge of existing vessels through rent-seeking behavior during the allocation process.²⁰⁴ And while trading has worked well with respect to improving ambient air quality and reducing emissions from stationary sources like power plants, applying such a program to mobile ships, flying the flags of various nations and utilizing multiple trade routes in and through the Great Lakes, would be difficult at best.²⁰⁵

Finally, absent carefully designed geographic parameters, a trading program could result in "hot spots"²⁰⁶ where exotic species are more likely to be released or to gravitate. The Clean Air Act's acid rain program stands accused of facilitating trades to Midwestern utilities, allowing them to exceed their own sulfur dioxide allowances, thereby exacerbating pollution problems in surrounding areas.²⁰⁷ As a result of

201. Compare 33 U.S.C. § 1313(d)(1)(C) (1994) (TMDLs shall be allocated to meet water-quality standards) with 42 U.S.C. §§ 7409, 7502(c)(2) (1994) (state implementation plans must make "reasonable further progress" toward meeting National Ambient Air Quality Standards).

202. See 33 U.S.C. §§ 1311(b), 1314(b), 1342(a)(1), (o).

203. See *id.* § 1251(a)(1).

204. See Hirsch, *supra* note 196, at 358. Existing utilities benefited from the Clean Air Act scheme because sulfur dioxide allowances were initially allocated to them based on historic emission levels, but new utilities are required to purchase allowances to commence operations. *Id.* at 380. The concept of rent-seeking assumes that any ostensibly public-interest regulation that emerges from a political process must have been designed to favor concentrated interests, such as subgroups of the regulated industry attempting to burden their rivals. See Jonathan Baert Wiener, *On the Political Economy of Global Environmental Regulation*, 87 GEO. L.J. 749, 754 (1999). In other words, "advocacy groups use environmental regulation, not to achieve general environmental quality improvement (a public good), but rather to deliver other more parochial ends (private goods)." *Id.* at 755. For an assessment of whether the implementation of the Clean Air Act's trading program ultimately lends support to this theory, see Paul L. Joskow & Richard Schmalensee, *The Political Economy of Market-Based Environmental Policy: The U.S. Acid Rain Program*, 41 J.L. & ECON. 37, 81 (1998) (concluding that the actual allocation of allowances "appears more to be a majoritarian equilibrium than one heavily weighted toward a narrowly defined set of economic or geographical interests. It is not strongly consistent with the predictions of standard models of interest group politics").

205. See Driesen, *supra* note 170, at 3 (noting that "no international regime has an active allowance trading program in place," and discussing the failure to agree on trading "ground rules" in the climate change context).

206. See Fulstone, *supra* note 198, at 480 n.109. Hot spots are generally described as concentrations of emissions within a particular geographic area. See Hirsch, *supra* note 196, at 393.

207. See Burtraw & Swift, *supra* note 195, at 10,421 (suggesting that a subregional cap could be created for sensitive airsheds to address pollutant concentrations, but concluding that, "[i]n the long

prevailing wind patterns, acid rain from these coal-fired power plants tends to fall in the northeast. Ironically, northeastern utilities, which are generally newer and cleaner, may end up fouling their own nest, so to speak, by selling their allowances to the very Midwestern utilities that send their excess sulfur dioxide emissions across state and regional lines. As a result, the pollution problem cannot be attributed directly to the power plant located in the affected area but instead to a distant source of pollution, minimizing incentives for community mobilization and local political pressure.

This is not to say that economic tools, such as trading programs, or providing rebates for clean ballast or taxing dirty ballast, must be universally rejected. The use of these and other types of economic initiatives should be explored in more detail, with appropriate consideration given to context, to determine their potential for enhancing—but not replacing—the underlying regulatory controls.

C. *Public Involvement and Enforcement*

The CWA permit program is all the more effective as a regulatory tool because it provides opportunities for public involvement as well as straightforward enforcement provisions, while economic initiatives generally lack these features. Before a permit may issue, the EPA must allow for public comment and determine that the discharge will comply with the applicable requirements of the CWA.²⁰⁸ Input received during the public comment period is included as part of the administrative record.²⁰⁹ At the close of the comment period, the Regional Administrator decides whether to issue or deny the permit.²¹⁰ Any interested person may request a formal hearing within thirty days of the Administrator's determination.²¹¹ These opportunities for involvement at various levels of the decision making process assist the EPA in reaching a well-informed decision, based not only on agency data but also on research and opinions by interested parties, who often have vastly different perspectives.

term, an [overall national] emission cap system may do more for such sensitive regions because pollutant loads do not increase with economic growth"); Kirsten Engel & Scott Saleska, *Don't Trade Away Benefits of Clean Air*, BOSTON GLOBE, May 29, 2000, at A15 (suggesting that geographic constraints on trading may be appropriate, along with reductions in the overall sulfur dioxide cap, to avoid hot-spot problems in the northeast); see also Hirsch, *supra* note 196, at 373–74 (describing positions of interested parties during congressional debates on sulfur dioxide trading program).

208. See 33 U.S.C. § 1342(a)(1) (1994); 40 C.F.R. § 124.12(c) (1999). States that have assumed delegated authority to administer the program also must allow opportunities for public input before ruling on permit applications. See 33 U.S.C. § 1342(b)(3); 40 C.F.R. § 123.25.

209. See 40 C.F.R. §§ 124.10, 124.12(a)(4).

210. See *id.* § 124.15.

211. See *id.* § 124.74(a).

Once a permit is in place, the CWA provides for enforcement through temporary or permanent injunctions, administrative, civil and criminal penalties, and citizen suits.²¹²

This straightforward and effective enforcement scheme, in which the permit holder must report on and be held accountable for its compliance with its permit and which provides multiple opportunities for enforcement, including by citizens, did not come about by accident. Congress consciously mandated an aggressive, effective enforcement system when it drafted the Clean Water Act, providing, for example, for citizen suits. During Senate consideration of the conference report in 1972, Sen. Birch Bayh (D-Ind.) said: "We have learned by disappointing experience, Mr. President, that without strict enforcement and meaningful deterrents, water pollution control laws will have no real effect. The bill before us provides the enforcement and deterrents we need."²¹³

Under section 309, the EPA can assess administrative penalties in an amount up to \$10,000 for each violation of a statutory or permit provision.²¹⁴ If a judicial proceeding is initiated, civil penalties up to \$25,000 per day for each violation may be assessed.²¹⁵ First time offenders who either negligently or knowingly violate a statutory or permit provision can be assessed with criminal fines up to \$25,000 per day of violations and imprisonment for not more than one year, or \$50,000 per day and imprisonment for not more than three years, respectively.²¹⁶ Fines go up, as does the duration of potential jail time, if the violator is a repeat offender, or knows that the violation puts another person in imminent danger of death or serious bodily injury.²¹⁷

In addition, section 505 authorizes citizen suits "against any person . . . who is alleged to be in violation of . . . an effluent standard or limitation under this chapter."²¹⁸ Successful plaintiffs can recoup their attorneys' fees and costs.²¹⁹ In enacting section 505, Congress recognized, at least implicitly, that watchful citizens would be especially effective advocates.²²⁰ As a result of citizen-suit provisions like those found in the

212. See 33 U.S.C. §§ 1319, 1365.

213. Drew Caputo, *A Job Half Finished: The Clean Water Act After 25 Years*, [1997] 27 *Env'tl. L. Rep. (Env'tl. L. Inst.)* 10,574, 10,580 n.82 (Nov. 1997) (citing 1 LIBRARY OF CONGRESS, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 216 (Comm. Print compiled for the Senate Comm. on Pub. Works 1973)).

214. See 33 U.S.C. § 1319(g)(2). States with approved programs are also given the authority to assess penalties. See *id.* §§ 1319(a), 1342(b)(7).

215. See *id.* § 1319(b), (d).

216. See *id.* § 1319(c)(1)-(2).

217. See *id.* § 1319(c)(1)-(3).

218. *Id.* § 1365(a)(1). An "effluent standard or limitation" is defined as, among other things, an unlawful act under CWA section 301(a). *Id.* § 1365(f).

219. See *id.* § 1365(d).

220. See WILLIAM H. RODGERS, JR., *ENVIRONMENTAL LAW* 271 (2d ed. 1994) (noting that Congress, through various provisions of the CWA, encouraged "citizen initiatives to enforce the water pollution laws"); see also Jeffrey G. Miller, *Private Enforcement of Federal Pollution Control Laws*,

CWA, litigation has played a significant, and even dominant, role in American environmental policy and law.²²¹ The list of citizen suits that have impacted the way business is done in the United States is impressive, ranging from ConEdison's thwarted plan to build a huge hydroelectric facility on Storm King Mountain, to the Tennessee Valley Authority's confrontation with the infamous snail darter, to Disney's failed attempts to build a ski resort in an isolated valley of the Sequoia National Forest.²²²

Citizen suits provide a vehicle for enforcement where the EPA has been unwilling or unable to move forward due to lack of resources or lack of political fortitude.²²³ They are especially important to ensure the implementation of politically charged programs like water-quality standards and pollutant allocations for nonpoint sources, many of which require changes in local land use planning. For example, the TMDL requirement for addressing impaired water bodies was virtually ignored by the EPA and the states until a series of citizen suits forced compliance.²²⁴

It is fair to say that, without citizen enforcement, most environmental programs would have "languish[ed] under the political constraints of the marketplace."²²⁵ If not checked by aggressive enforcement, particularly by citizens, industry almost inevitably bows to the pressure to pollute: noncompliance yields direct economic benefits through the free use of water for waste disposal, while compliance, re-

Part I, [1983] 13 Env'tl. L. Rep. (Env'tl. L. Inst.) 10,309, 10,310-11 (Oct. 1983) (detailing legislative history of citizens' suits provisions).

221. See Claudia Polsky & Tom Turner, *Justice on the Rampage*, 21 AMICUS J. 34 (1999). "One of the greatest elements of the U.S. system of environmental law, itself arguably the greatest in the world, is the citizen lawsuit." *Id.*

222. See *Scenic Hudson Preservation Conference v. Federal Power Comm'n*, 354 F.2d 608, 624-25 (2d Cir. 1965) (setting aside and remanding a Federal Power Commission license to construct pumped-storage hydroelectric project at Storm King); *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 193-95 (1978) (enjoining construction of Tellico dam). In *Sierra Club v. Morton*, 405 U.S. 727, 740-41 (1972), the Court held that the Sierra Club did not have standing because it failed to allege that either the organization or its members would be affected by Disney's proposed ski resort. In the end, however, the resort was never actually built. See RODGERS, *supra* note 220, at 209 n.12.

223. See Michael D. Axline & Patrick C. McGinley, *Universal Statutes and Planetary Programs: How EPA Has Diluted the Clean Water Act*, 8 J. ENVTL. L. & LITIG. 253, 287-88 (1993); Michael R. Lozeau, *Tailoring Citizen Enforcement to an Expanding Clean Water Act: The San Francisco Baykeeper Model*, 28 GOLDEN GATE U. L. REV. 429, 440 (1998) (describing role of NRDC in CWA enforcement during diminished role of Reagan administration's EPA).

224. See Houck, *supra* note 117 at 10,395-97.

225. Plater, *supra* note 129, at 382-83 n.54; see JOHN CRONIN & ROBERT F. KENNEDY, JR., *THE RIVERKEEPERS: TWO ACTIVISTS FIGHT TO RECLAIM OUR ENVIRONMENT AS A BASIC HUMAN RIGHT* 177-99 (1997) (discussing need for citizen enforcement in light of underenforcement by federal and state environmental agencies due to "agency capture" by regulated industry, political pressure, and budget shortfalls); *Friends of the Earth v. Consolidated Rail Corp.*, 768 F.2d 57, 63 (2d Cir. 1985). "Congress made clear that citizen groups are not to be treated as nuisances or troublemakers but rather as welcomed participants in the vindication of environmental interests." *Id.* (quoting *Friends of the Earth v. Carey*, 535 F.2d 165, 172 (2d Cir. 1976)).

quiring the construction and operation of expensive pollution removal facilities, imposes hefty financial costs.²²⁶

In comparison, economic initiatives, whether in the form of subsidies or taxation, generally inhibit citizen involvement. Citizens, as taxpayers, often have difficulty establishing standing to challenge federal spending programs in court.²²⁷ In *Massachusetts v. Mellon*,²²⁸ a taxpayer alleged that Congress, in enacting the Maternity Act of 1921, had exceeded the spending power of Article I, Section 8, depriving her of property without due process in violation of the Fifth Amendment, and had invaded the legislative powers reserved to the states by the Tenth Amendment.²²⁹ The Supreme Court held that the taxpayer had no standing to bring these general grievances about the conduct of government or the balance of power in the federal system.²³⁰ Unless a taxpayer alleges a violation of a specific constitutional limitation on the spending power, such as the Establishment Clause of the First Amendment, the challenge to a governmental tax or subsidy will be dismissed.²³¹ Public-interest plaintiffs challenging economic programs applicable to ballast-water discharges would most likely allege arbitrary and capricious action under the EPA,²³² but such plaintiffs would presumably lack standing.²³³

In sum, bringing ballast-water discharges into the CWA program would result in almost immediate improvement. The CWA's provisions for hefty civil and criminal penalties, along with citizen suits with attorney fee awards, provide powerful incentives for dischargers to improve operations as soon as possible.²³⁴ At the same time, the opportunity for both industry and environmental interest groups to challenge EPA decisions in court provides a tremendous incentive for the agency to equitably and reasonably balance competing interests and embrace effective, yet practical, solutions.²³⁵

226. See CRONIN & KENNEDY, *supra* note 225, at 178; cf. *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs. (TOC), Inc.*, 120 S. Ct. 693, 707 (2000) (discussing deterrent effect of CWA civil-penalty awards).

227. See U.S. CONST. art. III (providing federal courts with jurisdiction to hear only cases or controversies).

228. 262 U.S. 447, 479 (1923).

229. See *id.*

230. See *id.* at 480.

231. See *Flast v. Cohen*, 392 U.S. 83, 103 (1968) (noting that "one of the specific evils feared by those who drafted the Establishment Clause . . . was that the taxing and spending power would be used to favor one religion over another or to support religion in general").

232. See 5 U.S.C. § 706 (1994).

233. Challenges to economic incentive programs almost routinely are rejected for lack of standing, see *Simon v. Eastern Ky. Welfare Rights Org.*, 426 U.S. 26, 44-45 (1976); *Allen v. Wright*, 468 U.S. 737, 753 (1984), unless the plaintiff is directly affected as either a recipient of the subsidy in question, see *Sierra Club v. Glickman*, 82 F.3d 106, 110 (5th Cir. 1996), or suffers competitive disadvantage due to the program, see *Alliance for Clean Coal v. Miller*, 44 F.3d 591, 594 (7th Cir. 1995).

234. See *Rodgers*, *supra* note 117, at 1012, 1020-21 (noting that one of the reasons for the CWA's successes in reducing water pollution is its effective system of monitoring, underscored by a highly effective citizen suit mechanism).

235. "Judicial review is one reason American environmental law works, and the quite similar laws of other countries do not." Houck, *supra* note 109, at 467.

V. THE PRACTICAL IMPLICATIONS OF NPDES PERMITTING FOR VESSELS

The regulation of ballast-water discharges through NPDES permits will, no doubt, present a challenge, in part because the EPA does not have the expertise in regulating ships that it does regulating industrial dischargers. As a result, shipping companies and trade groups, accustomed to dealing with national coast guards and port authorities, will be resistant when the EPA jumps into the existing regulatory fray.

The more significant obstacle to effective ballast-water management arises from the fact that commercial cargo ships are, by their very nature, mobile, and not only originate from various nations but also frequently cross jurisdictional lines. The CWA framework, where the EPA typically delegates the NPDES permitting responsibilities to the states, each of which may exercise authority over a vessel "point source" crossing through its waters, poses special concerns when it comes to shipping. Disparities among interested states are quite possible, because although states cannot dip below the federal thresholds, each individual state can impose more stringent controls than the effluent limitations established by the EPA.²³⁶

The logistical difficulties inherent in regulating vessels and their ballast-water discharges do not provide the EPA with an excuse to avoid regulation altogether. Courts have flatly rejected the notion that "administrative impossibility" justifies a refusal to require NPDES permits for categories of point source dischargers.²³⁷ Instead, the EPA must require permits, but the CWA "gives [the] EPA considerable flexibility in framing the permit to achieve a desired reduction in pollutant discharges."²³⁸ Accordingly, the EPA might opt for gross reductions in pollutant discharges from a category of vessels, rather than engage in the fine-tuning necessitated when numerical effluent limitations are incorporated in individual permits. "But this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all."²³⁹

Even if the EPA initially addressed the problem of ballast-water discharges by using a general-permit approach,²⁴⁰ performance would improve. General permits, addressed to a class of point source dischargers or a particular area or region, allow for public participation and require the EPA to focus on the effects of a region or category of activities

236. See Clean Water Act, 33 U.S.C. § 1370 (1994); 40 C.F.R. § 122.1(f) (1999); see also O'Toole, *supra* note 84, at 45 (discussing the Navy's difficulties in complying with disparate state standards, and noting that "no state has yet required the permitting of a U.S. Navy ship, though individual discharges are being increasingly challenged").

237. *NRDC v. Costle*, 568 F.2d 1369, 1383 (D.C. Cir. 1977).

238. *Id.* at 1380.

239. *Id.*

240. See 40 C.F.R. § 122.28.

and to revisit the issue every five years or less.²⁴¹ In comparison, an exemption like section 122.3²⁴² “tends to become indefinite: the problem drops out of sight, into a pool of inertia, unlikely to be recalled in the absence of crisis or a strong political protagonist.”²⁴³

A. *Effluent Limitations for New and Existing Vessels*

NPDES permits must include technology-based effluent limitations,²⁴⁴ water-quality-related effluent limitations and water-quality standards, and ocean-discharge criteria.²⁴⁵ Effluent limitations vary according to type of pollutant emitted, and whether the discharger is a new or existing source.

As discussed above, new sources are generally subject to the strictest standard of the CWA, the “best available demonstrated control technology” (BAT),²⁴⁶ regardless of the type of pollutants emitted. Pursuant to section 306, BAT performance standards require the greatest degree of effluent reduction achievable through the application of the best demonstrated technology for an industrial class.²⁴⁷ The BAT standard can force changes in operating methods, processes or other alternatives, “including, where practicable, a standard permitting no discharge of pollutants.”²⁴⁸ Because new sources have the opportunity to install the best and most efficient production processes and wastewater-treatment technologies, generally at lower cost than retrofitting existing facilities, BAT “should represent the most stringent numerical values attainable through the application of the best available control technology” for all types of pollutants.²⁴⁹

A source is considered “new” if construction began after proposed regulations establishing performance standards for the relevant category of sources are published.²⁵⁰ BAT has only been prescribed for a limited

241. See *NRDC v. Costle*, 568 F.2d at 1382; see, e.g., Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity, 57 Fed. Reg. 41,236 (1992) (providing for general permits for storm water discharges, and requiring facilities to “implement a site-specific storm water pollution prevention plan”; however, if storm water discharges in a particular watershed or from particular facilities or industries are found to cause water-quality problems, watershed-specific or other individualized permits may be required).

242. See 40 C.F.R. § 122.3.

243. *NRDC v. Costle*, 568 F.2d at 1382.

244. See 40 C.F.R. § 122.2 (defining effluent limitations as “[a]ny restriction imposed by the Director on quantities, discharge rates, and concentrations of ‘pollutants’ which are ‘discharged’ from ‘point sources’ into ‘waters of the United States,’ the waters of the ‘contiguous zone,’ or the ocean”).

245. See Clean Water Act, 33 U.S.C. § 1342(a)–(c) (1994). The Administrator can also set “other requirements as he deems appropriate.” *Id.* § 1342(a)(2).

246. *Id.* § 1316(a)(1).

247. See *id.* § 1316(a)(1).

248. *Id.*

249. Pharmaceutical Manufacturing Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards, 63 Fed. Reg. 50,388, 50,390 (1998) (to be codified at 40 C.F.R. pts. 136, 439).

250. See 33 U.S.C. § 1316(a)(2).

number of industrial categories, many of which are explicitly listed in section 306.²⁵¹ The EPA is directed to revise the list of categories governed by BADT "from time to time."²⁵²

The EPA, in all likelihood, could include commercial vessels as a category to be governed by BADT, although it is not entirely clear that section 306 was intended to apply to mobile sources.²⁵³ Section 306 defines a source as "any building, structure, facility, or installation from which there is or may be the discharge of pollutants."²⁵⁴ The inclusion of mobile sources within the terms "building" and "facility" would render a rather strained reading of section 306, given the plain and ordinary meaning of those terms.²⁵⁵ On the other hand, a vessel could be considered an "installation" or a "structure," as both terms seem broad enough to include any physical or operational system of parts or apparatus.²⁵⁶

An analogous provision of the Clean Air Act, section 111, expressly states that its new-source-review program is applicable only to "stationary sources,"²⁵⁷ indicating that Congress knew how to limit the application of more stringent requirements to new stationary sources when it wanted to. The Clean Air Act, however, defines the term "stationary source" in precisely the same manner as the CWA defines the term "source": "any building, structure, facility, or installation which emits or may emit any air pollutant."²⁵⁸ These comparable definitional sections arguably show that a new source is meant to include only stationary

251. See *id.* § 1316(b)(1)(A) (including pulp and paper mills, meat product and rendering processing, grain mills, and other types of industrial facilities).

252. *Id.* § 1316 (b)(1)(B).

253. See Ore Mining and Dressing: Point Source Category; Effluent Limitations Guidelines, 53 Fed. Reg. 18,764, 18,775 (1988) (to be codified at 40 C.F.R. pt. 440) (stating that the EPA initially believed that the new source criteria were not designed to address mobile operations); Consolidated Permit Regulations; NPDES New Dischargers, 45 Fed. Reg. 68,391 (1980) (to be codified at 40 C.F.R. pt. 122, 124) (the EPA suspending a portion of the final rule Oct. 15, 1980, and suspending NPDES "new discharger" requirements for mobile drilling rigs operating in certain offshore areas).

254. 33 U.S.C. § 1316(a)(3).

255. The broader term, "facility," is generally known as "something . . . that is built [or] installed" . . . "to serve a particular purpose." WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 444 (Merriam-Webster Inc. 1991). Facilities are defined by regulation as "buildings, structures, process or production equipment or machinery which form a permanent part of the new source and which will be used in its operation." 40 C.F.R. § 122.29(a)(5) (1999). Arguably, "process or production equipment and machinery" could encompass mobile sources, if they "form a permanent part of the new source." However, other provisions of the CWA provide separate and distinct definitions for vessels and facilities, indicating that the two terms should not be used interchangeably. See 33 U.S.C. § 1321(a)(3), (10)-(11). Under section 311, which addresses discharges of oil and hazardous substances, vessels located in, on, or under waters of the United States or under U.S. jurisdiction are excluded from the definition of "offshore facility." *Id.* § 1321(11).

256. A structure is generally defined as "something made up of a number of parts that are held or put together in a particular way." THE AMERICAN HERITAGE DICTIONARY 1208 (2d ed. 1985). An installation is defined, in pertinent part, as "[a] system of machinery or other apparatus set up for use." *Id.* at 666. However, the EPA has taken a more narrow view of the term installation on at least one occasion. See 40 C.F.R. § 61.141 (defining "installation," for purposes of the Clean Air Act's National Emission Standards for asbestos, as "any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator").

257. Clean Water Act, 42 U.S.C. § 7411(a)(2), (b)(1)(A) (1994).

258. *Id.* § 7411(a)(3).

sources for the purposes of both statutes.²⁵⁹ Yet the express limitation to stationary air sources makes sense in light of the overall structure of the Clean Air Act, which includes an entirely separate program for the regulation of mobile sources.²⁶⁰ To imply such a limitation in the context of the CWA is less plausible, given that the CWA addresses both stationary and mobile point sources through the NPDES program.²⁶¹

In fact, the EPA has issued BADT standards for two categories of sources that are at least somewhat mobile: offshore oil and gas extraction activities²⁶² and placer mines.²⁶³ Placer mines, where particles of pre-

259. See Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans, 45 Fed. Reg. 52,676, 52,696 (1980) (to be codified at 40 C.F.R. pts. 51, 52, 124) [hereinafter Requirements for Preparation]. The EPA stated that "to treat all of the activities of a ship [as a stationary source] while it is coming to, staying at, and going from a terminal would violate any common sense notion of 'building,' 'structure,' 'facility,' or 'installation.'" *Id.* (emphasis in original). Thus, the EPA concluded that marine terminals must include only ship emissions from "stationary" activities, such as dockside loading and unloading, in determining whether the terminal itself is a "major" source under the Clean Air Act's Prevention of Significant Deterioration (PSD) program, 42 U.S.C. §§ 7470-7479. See 42 U.S.C. § 7410(a)(5); see also *NRDC v. EPA*, 725 F.2d 761, 771-72 (D.C. Cir. 1984) (holding that the EPA must consider the relationship between vessels and terminals to determine which vessel emissions are stationary in nature so that they would be attributed to the terminals and included in the State Implementation Plans).

260. Title II of the Clean Air Act, 42 U.S.C. §§ 7521-7590, regulates emissions from mobile sources, while Title I governs emissions from stationary sources. See Clean Air Act, 42 U.S.C. §§ 7401-7515. This is not to say that overlap between the two programs is completely precluded by the Clean Air Act; for instance, Title I addresses "indirect sources" like parking garages, which result in increased air emissions due to the concentration of vehicles. See *id.* § 7410(a)(5)(C); *Sierra Club v. Larson*, 2 F.3d 462, 468 (1st Cir. 1993). Further, mobile sources can be considered stationary sources under the Clean Air Act when they emit pollutants in the course of activities that are stationary in nature, for example, ships that emit particulate dust during dockside loading operations. See Requirements for Preparation, *supra* note 259, at 52,696; see also *Sierra Club*, 2 F.3d at 468 (discussing 42 U.S.C. § 7602(z), which generally excludes internal combustion engines used for transportation purposes from the definition of stationary source). Likewise, even though the EPA currently excludes incidental discharges from vessels from the NPDES program, it does regulate seafood processing plants as point sources when they are acting in a capacity other than transportation. See Final General NPDES Permit for Seafood Processors in the State Waters of Alaska and in Receiving Waters Adjacent to Alaska and Extending Out 200 Nautical Miles from the Coast and Baseline of Alaska: Alaska Seafood Processors General NPDES Permit (No. AKG-52-0000), 60 Fed. Reg. 34,991 (1995) (notice of final general permit July 5, 1995); *Association of Pacific Fisheries v. EPA*, 615 F.2d 794, 806 n.7, 815 (9th Cir. 1980).

261. Courts have consistently held that mobile sources like dump trucks and bulldozers can qualify as "point sources" under the CWA. See *United States v. Pozsgai*, 999 F.2d 719, 726 (3d Cir. 1993); *Avoyelles Sportsmen's League, Inc. v. Marsh*, 715 F.2d 897, 922 (5th Cir. 1983); *In re Alameda County Assessor's Parcel Nos.*, 672 F. Supp. 1278, 1284-85 (N.D. Cal. 1987); *United States v. Tull*, 615 F. Supp. 610, 622 (E.D. Va. 1983), *aff'd*, 769 F.2d 182 (4th Cir. 1985), *rev'd on other grounds*, 481 U.S. 412 (1987); see also *Concerned Area Residents for the Env't v. Southview Farm*, 34 F.3d 114, 119 (2d Cir. 1994) (finding that vehicles used to spread manure are point sources).

262. See Oil and Gas Extraction Point Source Category, Offshore Subcategory; Effluent Limitations Guidelines and New Source Performance Standards, 50 Fed. Reg. 34,591, 34,617-19 (1985) (to be codified at 40 C.F.R. pt. 435) (proposed Aug. 26, 1985) (proposed regulations for offshore activities, finding that the term "facilities" includes mobile drilling rigs placed at a drilling site, as well as production structures, platforms, and equipment); see also Oil and Gas Extraction Point Source Category; Offshore Subcategory Effluent Limitations Guidelines and New Source Performance Standards, 58 Fed. Reg. 12,454 (1993) (to be codified at 40 C.F.R. pt. 435) (establishing effluent limitations and performance standards for offshore oil and gas extraction activities). The final rule was upheld in *BP Exploration & Oil, Inc. v. EPA*, 66 F.3d 784, 804 (6th Cir. 1995).

cious metals are extracted from alluvial or glacial deposits, are frequently moved up and down a stream by the miner in search of "pay dirt."²⁶⁴ Without directly addressing the issue, the Ninth Circuit upheld the EPA's application of new-source-performance standards to placer mines,²⁶⁵ though such activities could be considered more mobile than stationary in nature. The inclusion of new vessels as "sources" would probably be upheld as well, as a reasonable interpretation of section 306.²⁶⁶

BADT would surely require improved exchange rates for new vessels, and would most likely require alternative treatment strategies as well.²⁶⁷ Several promising technologies are currently being explored: shore side treatment at POTWs; ultraviolet light; micro-filtration; ozonation; environmentally friendly biocides; and temperature (heat).²⁶⁸ The Canadian vessel *Algonorth*, with support from the Great Lakes Protection Fund, the Lake Carrier's Association and the Northeast Midwest Institute, is implementing a demonstration project utilizing a filter that can trap particles as small as twenty-five microns.²⁶⁹ This would eliminate aquatic vertebrates, fish eggs, and mussel veliger larvae, along with most invertebrate eggs, fungi, and algae cysts.²⁷⁰ With additional treatment, such as ultraviolet light or biocides, even smaller bacteria and viruses could be eradicated.²⁷¹

263. See Ore Mining and Dressing; Point Source Category; Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards, 53 Fed. Reg. 18,764 (1988) (to be codified at 40 C.F.R. pt. 440) (final rule regarding effluent limitations and performance standards for existing and new gold placer mines). By law, placer mines include "all forms of [mineral] deposit, excepting veins of quartz or other rock in place." 30 U.S.C. § 22 (1994); see Earl M. Hill, *A Brief History of the Nevada Law of Mining*, NEV. LAW., Oct. 1999, at 12, 13 (describing placer deposits).

264. See 53 Fed. Reg. at 18,774.

265. See *Rybachek v. EPA*, 904 F.2d 1276, 1292-93 (9th Cir. 1990) (upholding the EPA's inclusion of placer mines as a regulated category under CWA section 306, as codified at 33 U.S.C. § 1316 (1994)).

266. See *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842-44 (1984) (holding that courts must affirm reasonable interpretations of ambiguous statutory terms by an agency charged with implementing the statute).

267. Proposed amendments to NISA appear to require something like BADT. See *supra* notes 46-47 and accompanying text. Similarly, state legislation in several coastal states would require sterilization of ballast water before ships could enter their waters. See *infra* notes 291-93 and accompanying text.

268. See Foster, *supra* note 16, at 115-16 nn.121-24 (discussing success of various experimental treatment alternatives, and, in particular, assessing expert opinions regarding shipboard versus on-shore treatment); Reeves, *White Paper*, *supra* note 3, § 3.7 (assessing relative merits and costs of improved ballast exchange, filtering, ultraviolet light, biocides, heat, and on-shore treatment).

269. See *Managing Ballast Water to Stop the Introduction of Non-Indigenous Species* (visited July 16, 2000) <<http://www.lcships.com/hpbw.html>> [hereinafter *Managing Ballast Water*] (on file with the University of Illinois Law Review).

270. See Allegra Cangelosi et al., *The Biological Effectiveness of Filtration as an On-Board Ballast Treatment Technology* (1999) (visited Sept. 15, 2000) <<http://www.nemw.org/abstracts.htm>> (on file with the University of Illinois Law Review); Reeves, *White Paper*, *supra* note 3, § 3.7.

271. See Reeves, *White Paper*, *supra* note 3, § 3.7. The *Algonorth* project, however, filters only 1,500 gallons per minute; U.S. lakers, carrying as much as 14 million gallons of ballast water when "light" on cargo, could require filtration up to 18,000 gallons per minute. See *Managing Ballast Water*, *supra* note 269, at 3; Allegra Cangelosi, *The Algonorth Experiment*, 25 SEAWAY REVIEW 29, 29-33

Of course, the EPA need not be "fully cognizant of every innovation, wherever employed," but it is arbitrary and capricious to consider only those technologies that are widely available.²⁷² For example, the EPA has been required to consider zero discharge as the BADT standard for the organic chemicals, plastics, and synthetic fibers industries where several plants, utilizing recycling technologies, had already eliminated their discharges.²⁷³ Yet BADT would not necessarily require new vessels to meet standards as stringent as those achieved utilizing the filters employed on the *Algonorth* until filtering technology has been demonstrated as available for the size and type of tanker in question.

Effluent limitations for existing facilities and vessels vary according to the type of pollutant discharged. Existing sources of conventional pollutants, such as suspended solids and fecal coliform, must meet the best conventional technology (BCT) for their industrial class.²⁷⁴ In comparison, existing sources of toxic and nonconventional pollutants are required to meet effluent limitations based on the more stringent BAT standard.²⁷⁵

Toxic pollutants are those that, upon exposure, may cause serious, adverse human-health effects.²⁷⁶ Nonconventional pollutants comprise a "catch-all" category of pollutants—those that are not toxic or conventional.²⁷⁷ Congress explicitly listed several nonconventional pollutants, such as chlorine, ammonia, and color, as well as the thermal component of discharges,²⁷⁸ and gave the EPA authority to list additional nonconventionals.²⁷⁹

(Jan.–Mar. 1997). A demonstration project utilizing a Voraxial Separator unit capable of processing 4,500 gpm has recently gained the support of the U.S. Maritime Administration and the National Oceanic and Atmospheric Administration for implementation onboard the "Cape May" in the Baltimore area. See *Enviro Voraxial Maritime Solutions win support of MARAD*, 11 Int'l Env't 9, 2000 WL 7448642 (09/01/00).

272. *Chemical Mfrs. Ass'n v. EPA*, 870 F.2d 177, 263 (5th Cir. 1989).

273. See *id.* at 264; Houck, *supra* note 109, at 452 (noting that the EPA's final standard for organic chemicals and plastics could hardly be called the best available demonstrated technology, where the EPA failed to recognize that recycling technologies adopted by a number of plants had already achieved zero discharge).

274. See Clean Water Act, 33 U.S.C. § 1314(a)(4) (1994). The CWA lists the following conventional pollutants: biochemical oxygen-demanding pollutants (BOD), like nitrogen and phosphorous; total suspended solids (TSS); fecal coliform; and pH. See *id.* § 1314(a)(4). The EPA subsequently designated oil as an additional conventional pollutant on July 30, 1979. See *Identification of Conventional Pollutants*, 44 Fed. Reg. 44,501, 44,501 (1979) (codified at 40 C.F.R. pt. 401). Conventional pollutants are generally oxygen demanding and eutrophying, or contribute to turbidity. See *Development of Water Quality-Based Permit Limitations for Toxic Pollutants; National Policy*, 49 Fed. Reg. 9016, 9017 (1984).

275. See 33 U.S.C. § 1311(b)(1), (g)(1).

276. See *id.* § 1362(13) (defining toxic pollutants as those that, upon exposure, may cause "death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organism or their offspring"). Toxic water pollutants are listed pursuant to section 307. See *id.* § 1317.

277. See *id.* § 1311(b)(2)(F), (g)(1), (g)(4).

278. See *id.* § 1311(g)(1), (g)(4).

279. See *id.* § 1311(b)(2)(F).

Although some components of ballast-water discharges, such as suspended solids, would be considered conventional pollutants, biological materials, including exotic species, would likely fall under the catch-all category of nonconventional pollutants subject to BAT. If the EPA were to characterize exotics as nonconventionals, that determination would be accorded judicial deference as a reasonable interpretation of the statute.²⁸⁰

BAT generally requires that existing technology utilized by the "cleanest" firms in the industry be adopted.²⁸¹ In setting BAT, the EPA takes into account engineering technology and operational processes for categories and subcategories of industry.²⁸² Although BAT is established with reference to the "best" technology, it does not require the regulated facility to adopt any one particular technology. Instead, individual dischargers may choose their own abatement technique as long as the effluent levels specified in their permits are met.²⁸³

In addition, as with BADT, the EPA is to consider the costs of achieving the best technology available, and any non-water-quality impacts as well as energy requirements, in setting BAT.²⁸⁴ The EPA retains considerable discretion in assigning the weight to be given these factors.²⁸⁵ Although costs play a role in setting BAT, unlike the BCT limitation for conventional pollutants,²⁸⁶ the EPA need not perform a cost-benefit analysis or otherwise justify its choice of BAT on economic grounds as long as it has determined that the costs can be borne by industry.²⁸⁷ That the technology is in fact available provides evidence that

280. See *Rybachek v. EPA*, 904 F.2d 1276, 1292 (9th Cir. 1990) (finding that the "EPA's decision to treat settleable solids as a nonconventional pollutant and thus subject to BAT standards was both reasonable and permissible"). The court noted that "even if settleable solids should more properly be considered a conventional pollutant, . . . [the] EPA has determined that settleable solids in placer mining effluent are a toxic pollutant indicator and thus may be subject to BAT-level limitations." *Id.*; see also *American Petroleum Inst. v. EPA*, 858 F.2d 262, 263 n.2 (5th Cir. 1988) (upholding EPA's designation of diesel oil as nonconventional "indicator" pollutant, resulting in imposition of more stringent BAT regulations over discharge of muds and cuttings contaminated with diesel oil for use in offshore drilling operations).

281. See *Houck*, *supra* note 109, at 451.

282. See 33 U.S.C. §§ 1311(b)(2)(A), 1314(b)(2)(B); *Houck*, *supra* note 109, at 445 n.188.

283. See *Thompson*, *supra* note 118, at 522.

284. See 33 U.S.C. § 1314(b)(2)(B).

285. See *Chemical Mfrs. Ass'n v. EPA*, 870 F.2d 177, 204-07 (5th Cir. 1989).

286. BCT is roughly equivalent to the "best of the average" performers in an industrial category. BCT limitations are established in light of a variety of factors, including a two-part, "cost-reasonableness" test. See 33 U.S.C. § 1314(b)(4)(B); *American Paper Inst. v. EPA*, 660 F.2d 954, 960-61 (4th Cir. 1981). The EPA's current methodology for the development of BCT limitations was issued in 1986. See *Best Conventional Pollutant Control Technology; Effluent Limitations Guidelines*, 51 Fed. Reg. 24,974 (1986) (to be codified at 40 C.F.R. pts. 405-409, 411, 412, 418, 422, 424, 426, 432).

287. See *Chemical Mfrs. Ass'n*, 870 F.2d at 250 n.320 (citing *EPA v. National Crushed Stone*, 449 U.S. 64 (1980)). Section 304(b)(2)(B) "does not state that costs shall be considered in relation to effluent reduction." *EPA v. National Crushed Stone*, 449 U.S. 64, 71 n.10 (1980).

costs can be borne by the industry. Most facilities have been able to comply with BAT at a reasonable cost.²⁸⁸

BAT does not require turning a blind eye toward differences among facilities within industrial categories and among geographical areas. The EPA has the authority to grant variances or modifications to account for operational differences and even economic hardship.²⁸⁹ Section 301(g)²⁹⁰ authorizes a waiver from BAT requirements for nonconventional pollutants if the applicant can demonstrate that its proposed modified effluent limitation is equal to or more stringent than both the applicable water-quality standards and the initial standard required under the CWA, i.e., the "best practicable control technology currently available" (BPT).²⁹¹ The applicant also must show that the modification will not result in additional requirements for other sources, and that it will not impair the integrity of the receiving water or pose unacceptable risks to the environment or human health.²⁹²

In addition, section 301(c) gives the EPA authority to modify BAT for a facility or vessel upon a showing that modified requirements will: (1) represent the maximum use of technology within the economic capability of the owner or operator, and (2) result in reasonable further progress toward the elimination of pollutant discharge.²⁹³ Section 301(n) also allows variances if the facility demonstrates that it is fundamentally different than other facilities within its industrial category with respect to the relevant factors used in establishing effluent limitations.²⁹⁴

The imposition of BAT would force existing vessels to achieve better exchange rates, and might, in time, require alternative technologies to minimize the potential for introducing exotics through ballast discharges. There is reason to believe that existing vessels can do much better than the eighty-five percent exchange rate referenced in NISA, as would be necessary if BAT applied. In fact, the Coast Guard has indicated that ninety percent is an achievable rate of exchange for existing vessels.²⁹⁵ Other estimates range as high as ninety-eight percent as a "reasonably high" exchange standard.²⁹⁶

288. See Shapiro & McGarity, *supra* note 123, at 744 n.80; Percival, *Regulatory Evolution*, *supra* note 153, at 180.

289. See, e.g., 33 U.S.C. § 1311(c), (g), (h).

290. See *id.* § 1311(g).

291. See *id.* § 1311.

292. See *id.* § 1311(g).

293. See *id.* § 1311(c).

294. See *id.* § 1311(n). The CWA also allows waivers for dischargers that use "innovative technology," so long as their control method has potential for industrywide use and advances the CWA's goal of eliminating the discharge of pollutants. See *id.* § 1311(k). This section waives compliance with otherwise applicable standards for up to two years. See *id.*; see also Derzko, *supra* note 187, at 30.

295. See Implementation of the National Invasive Species Act of 1996 (NISA), 63 Fed. Reg. 17,782, 17,785-89 (1998) (to be codified at 33 D.F.R. pt. 151) (notice of proposed rulemaking Apr. 10, 1998).

296. See Reeves, *Analysis of Laws & Policies*, *supra* note 20, at 66.

The CWA's effluent limitations also would apply to NOBOBs. The vessel itself is the regulated point source, regardless of the quantity of ballast water; therefore, BADT and BAT would be set for NOBOBs just as they would be for other vessels. BAT might require NOBOB vessels to "swish and spit" by lightening their cargo by an amount allowing an influx of enough water to pump out the residues.²⁹⁷ Other suggested treatment methods for sediment and slop in a NOBOB tank include chemical biocides and heat.²⁹⁸ Regardless, treatment would be required prior to discharge into U.S. waters, regardless of whether a vessel entered fully loaded or not.

B. Water-Quality Standards

In addition to technology-based effluent limitations, permit requirements must be ratcheted up if necessary to meet water-quality standards.²⁹⁹ Water-quality standards are generally adopted by the states, based on EPA guidelines and subject to EPA approval.³⁰⁰ Section 303(c) requires that state water-quality standards "protect the public health or welfare, enhance the quality of water and serve the purposes of this [Act.] . . . taking into consideration their use and value for . . . propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes."³⁰¹

Under section 303(c), a water-quality standard consists of two components: designated uses for which the particular water body is to be protected such as recreation, protection and propagation of fish and wildlife, or agricultural uses; and water-quality criteria to support those uses.³⁰² Each state must identify and submit a list of waters for which existing technology-based pollution controls are not stringent enough to attain or maintain water-quality standards, and the EPA must approve or disapprove the lists pursuant to section 303(d).³⁰³ For waters identified as water-quality impaired, states are required to establish Total Maximum Daily Loads (TMDLs) for problem pollutants as necessary to satisfy applicable water-quality standards with an adequate margin of safety.³⁰⁴ California has listed several water bodies as impaired due to the presence

297. This operation only would require approximately 1.5% reduction in cargo. *See id.* at 55.

298. *See id.*

299. *See* Clean Water Act, 33 U.S.C. § 1311(b)(1)(C) ("[T]here shall be achieved . . . any more stringent limitation, including those necessary to meet water quality standards . . . established pursuant to any State law or regulations . . .").

300. *See id.* §§ 1314(a), 1313(c).

301. *Id.* § 1313(c). The ultimate purpose of water-quality standards, like other provisions of the CWA, is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." *Id.* § 1251(a).

302. *See* 40 C.F.R. pt. 131 (1999). Water-quality criteria may be numeric or narrative. *See id.*

303. *See* 33 U.S.C. § 1313(d)(2).

304. *See id.* § 1313(d)(1)(C).

of exotic species.³⁰⁵ Theoretically, any permitted discharge into these impaired waters would be required to attain zero discharge of exotics to avoid further degradation and to protect designated uses.³⁰⁶

A few coastal states have addressed exotic species by enacting separate regulatory programs altogether. Both California and Washington have adopted fairly aggressive programs for regulating ballast water.³⁰⁷ After July 1, 2002, the discharge of ballast water into Washington state waters is authorized only if there has been an open-sea exchange or if the vessel has treated its ballast water to meet standards set by the Department of Fish and Wildlife.³⁰⁸ Washington law imposes monitoring and reporting requirements, with sampling and testing protocols to be determined by the Department by rule.³⁰⁹ Other coastal states are beginning to move in this direction. In Michigan, a bill is pending to require vessels to obtain permits from the Department of Environmental Quality, and to mandate that ballast water be one hundred percent purified through sterilization before entering Michigan waters.³¹⁰ New York representatives have introduced a similar measure.³¹¹

State programs that pose a danger of defeating federal CWA objectives might be preempted under the Supremacy Clause.³¹² They also may

305. See Clean Water Act Section 303(d): Availability of List Submissions and Proposed Decisions, 63 Fed. Reg. 59,556.

306. See 33 U.S.C. § 1313(d)(4)(A); Foster, *supra* note 16, at 114–15.

307. See H.B. 2466, 56th Leg., 2d Sess (Wash. 2000) (enacted Mar. 24, 2000); CAL. CODE § 71,203, (effective Jan. 1, 2000). California law requires all ships entering California ports from more than 200 miles offshore to either empty ballast water in the deep sea (2,000 meters depth), retain ballast water on-board, or treat it, and to manage ballast sediments, unless operators can show that such measures would produce an unsafe condition for the ship. See *id.* §§ 71,203–71,204(a). Operators must file reports regarding ballast management. See *id.* § 71,204(b). The California Water Resources Control Board is required to evaluate alternative management measures and recommend best available technologies that reflect the greatest economically feasible degree of reduction in the release of exotic species by 2002. See *id.* § 71,210.

308. See H.B. 2466 § 4(2). The treatment standard shall “ensure that the discharge of treated ballast water poses minimal risk of introducing nonindigenous species.” *Id.* § 5(5)(a). The department is directed to consider technological and practical feasibility in developing the standard, and, “where practical and appropriate, the standards shall be compatible with standards set by the United States coast guard and shall be developed in consultation with federal and state agencies to ensure consistency with the federal clean water act, 33 U.S.C. §§ 1251–1387.” *Id.*

309. See *id.* § 5(5)(b). Washington law provides an exemption for safety, but it is narrower than that found in NISA. See *id.* § 4(1) (“When weather or extraordinary circumstances make access to treatment unsafe to the vessel or crew, the master of a vessel may delay compliance with any treatment required under this subsection until it is safe to complete the treatment.”).

310. See S.B. 955, 90th Leg., Reg. Sess. (Mich. 2000) (introduced Feb. 1, 2000); Ron Brochu, *Great Lakes Shipping Industry Protests Proposals to Sterilize Ballast Water*, KNIGHT-RIDDER TRIB. BUS. NEWS, May 4, 2000 (noting that sponsor Sen. Ken Sikkema has softened his stance to allow “best available technology” rather than mandating sterilization).

311. See A.B. 11,369, 1999 Leg., 223d Sess. (N.Y. 2000) (introduced in Assembly and referred to Committee on Environmental Conservation June 9, 2000).

312. See U.S. CONST. art. VI, cl. 2; *United States v. Locke*, 120 S. Ct. 1135, 1152 (2000) (holding “that Washington’s tanker regulations regarding general navigation watch procedures, English language skills, training, and casualty reporting [were] preempted [by federal law]”); Craig H. Allen, *Federalism in the Era of International Standards: Federal and State Government Regulation of Merchant Vessels in the United States (Part IV)*, 31 J. MAR. L. & COM. 15 (2000) (proposing a new approach to maritime

be prohibited as interfering with international rights of passage.³¹³ State laws that require changes in vessel design or construction are especially likely to be invalidated.³¹⁴

Even if lawful, disparate standards among states with stringent standards, like California, and more lenient states would result in a patchwork quilt of regulation. To ensure compliance, vessels could be required to meet the most stringent restrictions of all states they pass through. Ship owners and operators will resist individual state efforts as confusing and inefficient. Effective and even-handed implementation of the CWA's programs for NPDES permits and water-quality standards for the control of ballast discharges will depend on cooperative efforts between the EPA and the states and between the EPA and the Coast Guard.

VI. INTERAGENCY AND INTERGOVERNMENTAL COOPERATION

The CWA encourages and even requires coordination between the EPA and the states, and between the EPA and other federal entities, including the military and the Coast Guard, in the regulation of water pollution. As for other federal agencies, the EPA must, for example, include a condition within permits issued to facilities that operate as transportation vessels specifying that their discharges comply with any applicable Coast Guard regulations for safe transportation, handling, and storage of pollutants.³¹⁵

More to the point, CWA section 312 specifies roles for both the EPA and the Coast Guard, and clarifies the role of the states, in regulating discharges of sewage through marine sanitation devices (MSDs) and incidental discharges from vessels of the armed forces through marine pollution-control devices (MPCDs).³¹⁶ It requires the EPA to establish general prohibitions and performance standards and provides the Coast Guard with enforcement authority, allowing it to board and inspect vessels on U.S. waters and to execute warrants issued by officers or courts of competent jurisdiction.³¹⁷ Section 312 also allows a limited role for states to protect water quality, while minimizing the potential for

preemption analysis, as a culmination of four articles on the regulation of vessel safety and pollution prevention).

313. See Dubner, *supra* note 5, at 149-53 (discussing international conventions governing passage of foreign vessels). Coastal states may take steps to regulate pollution in territorial seas, but such steps must be reasonable and nondiscriminatory, and may not interfere with rights of passage. See *UNCLOS*, *supra* note 104, arts. 19, 21, & 24.

314. See *Ray v. Atlantic Richfield Co.*, 435 U.S. 151, 163-68 (1978) (holding that Congress occupied the field and therefore preempted state laws on tanker design and construction); *UNCLOS*, *supra* note 104, art. 211 § 6(c) (state laws and regulations "may relate to discharges and navigational practices but shall not require foreign vessels to observe design construction, manning or equipment standards other than generally accepted international rules and standards.").

315. See 40 C.F.R. § 122.44(p) (1999).

316. See Clean Water Act, 33 U.S.C. § 1322 (1994).

317. See *id.* § 1322(k)(l). CWA section 312 may also be enforced by a state. See *id.*

state requirements to conflict with federal objectives. As such, section 312 could provide a cooperative model for the EPA to follow in regulating ballast-water discharges. Because MSD and MPCD requirements are not implemented through the NPDES permit program, section 312 is not a complete analogy for regulating ballast-water discharges from commercial vessels. Instead, absent legislative amendment, this section should be considered merely as guidance for building working relationships among interested agencies and states.

With respect to MSDs, the EPA, in consultation with the Coast Guard, must establish standards of performance to prevent the discharge of inadequately treated sewage from vessels,³¹⁸ and must also establish a testing and certification regime to regulate the sale of MSDs.³¹⁹ The standards, which are phased in over time for existing vessels,³²⁰ must be consistent with maritime safety and other marine and navigation laws, and coordinated with Coast Guard standards.³²¹ Commercial vessels operating in the Great Lakes must install MSDs that at least meet secondary treatment quality.³²²

MPCD performance standards for military vessels are to be issued by the EPA and the Department of Defense, in consultation with the Coast Guard and the Secretaries of State and Commerce.³²³ The standards should mitigate adverse impacts on the marine environment, considering the nature and environmental effects of the discharge, the practicability and costs of the installation and use of the MPCD, its effects on the vessel's operational capability, and applicable U.S. and international law.³²⁴ Standards may reflect distinctions between classes, types, and sizes of vessels, and may even be waived "as necessary or appropriate" for classes, types, or sizes of vessels, as well as for individual vessels.³²⁵

Currently, performance standards for military vessels are being issued pursuant to a joint effort by the EPA, Department of Defense (DOD), Department of State, Department of Commerce, and the Coast Guard.³²⁶ The EPA and DOD have determined that it is reasonable and

318. See *id.* § 1322(b). The EPA had previously been reluctant to regulate sewage discharges from vessels due to the lack of availability of pump-out facilities. See S. REP. NO. 95-370, at 66 (1977), *reprinted in* 1977 U.S.C.C.A.N. 4326, 4391.

319. See 33 U.S.C. § 1322(g)-(h).

320. See *id.* § 1322(c)(1)(A).

321. See *id.* § 1322(b)(1).

322. See *id.* § 1322(c)(1)(B).

323. See 33 U.S.C. § 1322(n)(3)(A) (Supp. IV 1998); see also *supra* Part III.B. (discussing legislative history of section 312(n)).

324. 33 U.S.C. § 1322(n)(2)-(3). CWA section 312(n) applies unless the Secretary of Defense finds that compliance "would not be in the national security interests of the United States." *Id.* § 1322(n)(1).

325. *Id.* § 1322(c)(2).

326. See Uniform National Discharge Standards for Vessels of the Armed Forces, 64 Fed. Reg. 25,126, 25,130 (1999) (to be codified at 40 C.F.R. pt. 9 and 40 C.F.R. ch. VII); Uniform National Discharge Standards for Vessels of the Armed Forces, 63 Fed. Reg. 45,298, 45,306 (1999) (to be codified at 40 C.F.R. pt. 1700 and ch. VII) (proposed Aug. 25, 1998).

practicable to regulate discharges of ballast water through MPCDs,³²⁷ and that current management practices for open-ocean exchange, based on international guidelines, "demonstrate the availability of controls to mitigate the potential adverse environmental impacts from this discharge."³²⁸

Congress expressly preempted most state laws and regulations regarding the design, manufacture, installation, or use of both MSDs and MPCDs.³²⁹ Upon petition to the EPA, however, states may prohibit discharges in some or all of the waters within the state as required for the protection and enhancement of water quality, if the EPA determines, *inter alia*, that adequate facilities for the safe and sanitary removal and treatment of sewage or ballast water from vessels are reasonably available.³³⁰

Looking to section 312, the EPA, with Coast Guard cooperation and input, could issue national effluent limitations for ballast-water discharges from commercial vessels, reflecting BAT for MPCDs or alternative treatment or exchange methods. The EPA, again with the Coast Guard as a consulting partner, could then issue general, regional, or individual permits incorporating the effluent limitations.³³¹ With a unified body of standards in place, vessel owners and operators get the benefits of certainty, and ships could be modified or designed to meet the standards, phased in to require state-of-the-art technologies within a reasonable period of time.³³²

327. See Uniform National Discharge Standards for Vessels of the Armed Forces, 63 Fed. Reg. at 45,309 (defining MPCD, as used in the proposed rule, as "a control technology or a management practice that can reasonably and practicably be installed or otherwise used on a vessel of the Armed Forces to receive, retain, treat, control or discharge a discharge incidental to the normal operation of the vessel").

328. *Id.* at 45,311. The Navy and the Coast Guard either currently implement or are in the process of approving a ballast-water management policy requiring an open-ocean, ballast-water exchange, based on the IMO Guidelines for Preventing the Introduction of Unwanted Aquatic Organisms and Pathogens from Ships' Ballast Water and Sediment Discharge. See *id.* at 45,306. In the final rule, the agencies noted that a more detailed assessment of the MPCD control options and performance standards for each class of vessels would be performed in a subsequent phase of rulemaking. See Uniform National Discharge Standards for Vessels of the Armed Forces, 64 Fed. Reg. at 25,130.

329. See 33 U.S.C. § 1322(f)(1) (1994). States are allowed to impose more stringent requirements for MSDs on houseboats. *Id.* § 1322(f)(1)(B).

330. See *id.* § 1322(f)(3)-(4), (n)(7)(B).

331. See, e.g., Final General NPDES Permit for Seafood Processors in the State Waters of Alaska and in Receiving Waters Adjacent to Alaska and Extending Out 200 Nautical Miles from the Coast and Baseline of Alaska: Alaskan Seafood Processors General NPDES Permit (No. AKG-52-0000), 60 Fed. Reg. 34,991 (1995) (notice of final general NPDES permit July 5, 1995) (authorizing certain discharges from offshore, nearshore and shore-based vessels and onshore facilities engaged in seafood processing; permitting discharges including processing wastes, process disinfectants, sanitary wastewater, boiler water, gray water, water used to transfer seafood to a facility, and live tank water "to waters of the United States in and contiguous to the State of Alaska, except for receiving waters excluded from coverage as protected, special, at-risk, degraded or adjacent to a designated 'seafood processing center'"; prohibiting discharges of petroleum hydrocarbons, toxic pollutants, or other pollutants not specified in the permit).

332. See O'Toole, *supra* note 84, at 48. O'Toole concludes that "[t]he best way to ensure Navy ship compliance is to develop a coherent body of effluent standards for application to all Navy ships in

Meanwhile, states would retain a role in enforcing the limitations contained within the permits.³³³ However, to avoid inconsistencies from port to port, the MSD and MPCD approach should be followed such that states could not impose more stringent requirements or establish "no discharge" zones absent appropriate determinations and approval by the EPA. Although states with delegated NPDES authority may be reluctant to relinquish some of that authority back to the federal agencies, in the context of ballast-water discharges, it would seem that states have more to gain than to lose under a program of uniform national effluent limitations.³³⁴

The EPA's ability to withdraw or otherwise limit only that part of a state NPDES program dealing with vessels may be inhibited by existing statutory provisions. The gist of section 402 is that states with "adequate authority" to carry out the permit program assume control over the entire program.³³⁵ To that end, state permit programs generally must be approved or disapproved in their entirety.³³⁶ The CWA does, however, allow for partial delegation, so long as the state's permit program covers major categories of point sources and is, in and of itself, a complete permit program covering a "significant and identifiable part of the State program."³³⁷

all waters of the U.S. and on the high seas." *Id.* at 46. Instead of EPA enforcement, however, he recommends that the standards be implemented through the existing command and control structure of the Navy. *See id.*

333. *See* 33 U.S.C. § 1342(b).

334. *See* O'Toole, *supra* note 84, at 48-49.

335. 33 U.S.C. § 1342(b)-(c). To establish "adequate" permit authority, states must insure, among other things, that their permits will (1) comply with CWA provisions governing effluent limitations, new sources, toxic pollutants, MSDs, and ocean-discharge criteria; (2) be limited to fixed terms not exceeding five years; (3) be terminated or modified for cause; (4) require reporting and inspection; and (5) be enforceable through civil and criminal penalties. *See id.* § 1342(b)(1)-(9). States must also insure that the EPA will receive notice of permit applications, *see id.* § 1342(b)(4), and that no permit will issue if the Army Corps of Engineers, after consulting with the Coast Guard, determines that "anchorage and navigation" of navigable waters would be "substantially impaired." *Id.* § 1342(b)(6).

336. *See id.* § 1342(c), (n); S. REP. NO. 92-414, at 71 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3737; 2 LIBRARY OF CONGRESS, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 1489 (Comm. Print compiled for the Senate Comm. on Pub. Works 1973). Congress explained that "after a State submits a program which meets the criteria established by the Administrator pursuant to regulations, the Administrator shall suspend his activity in such State under the Federal permit program." *Id.* It went on to state that it was not, however, persuaded "that by limiting the EPA's authority to withdraw approval of a state program to withdrawing approval as to the entire program, Congress emphasized that only one government shall operate an NPDES permit program within a State. . . . Even in delegated states, EPA retains 'substantial review authority.'" *Id.*; *see* EPA v. California *ex rel.* State Water Resources Control Bd., 426 U.S. 200, 226-27 (1976) (citing legislative history); Shell Oil v. Train, 585 F.2d 408, 410 (9th Cir. 1978) (noting that the EPA has residual supervisory responsibility under section 402's veto and withdrawal provisions, but stating that once a program is approved, the federal program is suspended, creating "a separate and independent State authority to administer the NPDES pollution controls") (citation omitted); *see also* Mianus River Preservation Comm. v. EPA, 541 F.2d 899, 905 (2d Cir. 1976).

337. 33 U.S.C. § 1342(n)(3)-(4). These provisions were designed to allow states to gradually assume a regulatory role, rather than taking authority for the entire program all at once. *See* Oliver A. Houck & Michael Rolland, *Federalism in Wetlands Regulation: A Consideration of Delegation of CWA § 404 and Related Programs to the States*, 54 MD. L. REV. 1242, 1292-93 (1995).

Once a state program is approved, the EPA can withdraw its approval if the state fails to administer it in accordance with federal requirements.³³⁸ Again, Congress intended that state programs not be piecemealed.³³⁹ In fact, Congress rejected an EPA proposal that section 402 be revised to allow withdrawal for categories or classes of sources, reflecting its concern that states be given maximum responsibility for the NPDES program and that the EPA's review authority be restricted as much as was consistent with its overall responsibility for assuring that the CWA's national goals are met in a timely fashion.³⁴⁰

In any event, EPA withdrawal is a drastic measure, and there are significant obstacles to taking back authority: "The procedures for withdrawal of state programs would be suitable for the Nuremburg trials, and will be invoked only upon epochal occasions."³⁴¹ Because of its disruptive nature and the resulting ill-will, the EPA and state governments generally strive to avoid withdrawal.³⁴²

Instead of withdrawing state NPDES programs that attempt to impose more stringent or contradictory requirements on ballast-water discharges, the EPA could take either of two less-drastic steps. Assuming that, once the EPA rescinds its exclusion for ballast-water discharges, states will have to seek approval of new provisions governing vessels, the EPA could simply refuse to approve that portion of the state program. Disapproval would be justified on the grounds that inconsistent state programs fail to comply with CWA provisions governing effluent limitations.³⁴³

Alternatively, if a state had an approved program, the EPA could veto individual ballast-water discharge permits issued by the state on the grounds that any nonuniform requirements are "outside the guidelines and requirements" of the CWA.³⁴⁴ In practice, the EPA's veto power is wielded with a light touch: "oversight is an essentially state-friendly pro-

338. See 33 U.S.C. § 1342(c)(3)-(4), (n).

339. See *id.* § 1342(c)(3), (d). These provisions have been described as giving "all-or-nothing authority to withdraw approval of a state NPDES program." *EPA v. California ex rel. State Water Resources Control Bd.*, 426 U.S. at 226 n.39.

340. See 1 LIBRARY OF CONGRESS, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 814, 854-55 (Comm. Print compiled for the Senate Comm. on Pub. Works 1973); H.R. REP. NO. 92-911 (1972). The first petition for the withdrawal of all delegated programs—air, water, and waste—was recently submitted by environmental groups in Ohio, in what the EPA calls an "unprecedented" move. See John C. Kuehner, *U.S. EPA to Review Ohio EPA's Operations*, CLEV. PLAIN DEALER, Feb. 2, 2000, at B1. The Ohio EPA is charged with mishandling public complaints, making technical errors in issuing permits, and underenforcing permit violations. See *id.* Bertram Frey, Deputy Regional Counsel for Region 5, which includes Ohio, reported that withdrawal was unlikely; instead, "[i]f corrections are needed, and the Ohio EPA agrees to them, 'that's the end of it.'" *Id.*

341. WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW 367-68 (footnote omitted) (2d ed. 1994).

342. See D. Brennan Keene, Comment, *The Inconsistency of Virginia's Execution of the NPDES Permit Program: The Foreclosure of Citizen Attorneys General from State and Federal Courts*, 29 U. RICH. L. REV. 715, 748-49 (1995).

343. See 33 U.S.C. § 1342(b)(1) (1994).

344. *Id.* § 1342(d)(2); see 40 C.F.R. § 123.44(c) (1999).

cess involving a great deal more jawboning and negotiation than adamant intrusion."³⁴⁵ However, individual permit supervision is far less offensive to state sovereignty than is withdrawal of the entire NPDES program, and the EPA should not be afraid to invoke its veto power in appropriate circumstances.³⁴⁶ Although Congress intended states to play a significant role in the NPDES program, Congress also wanted the EPA to assure uniformity and consistency by engaging in a vigorous review of state programs.³⁴⁷

VII. CONCLUSION

The CWA's NPDES program is clearly applicable to ballast-water discharges from vessels. Neither the difficulty of regulating mobile vessels, nor the possibility that costs may at times exceed economic benefits, justifies a refusal to regulate. The incorporation of technology-based controls through the NPDES permit system would result in rapid emission reduction, and could ultimately eliminate contaminated ballast-water discharges altogether.

Once the EPA rescinds its regulatory exclusion for ballast-water discharges, there are several approaches available to the EPA to minimize the administrative difficulties of regulating vessels and to ensure adequate control of their discharges through BAT and BACT. The regulatory outcome will be more readily acceptable to the shipping industry and to other interested governmental players if the EPA issues new regulations and general or individual permits with the cooperation and input of the Coast Guard and affected coastal states. When the appropriate permits are in place, monitoring will be less costly and more consistent, and enforcement more easily accomplished.

The imposition of BAT and BACT also could motivate vessel owners and operators to achieve a higher level of efficacy than under current requirements and guidelines. By imposing uniform national effluent limitations, the CWA levels the playing field and minimizes "forum shopping," and can even serve to stimulate innovation. Meanwhile, the states may still be able to play a meaningful role in controlling the discharge of ballast pollutants within their jurisdiction through delegated permit authority and water-quality standards.

Economic approaches, on the other hand, whether in the form of taxes, subsidies, or effluent-trading programs, are not explicitly authorized by the CWA. Even if implicitly allowed by law, none of these tools provides an adequate replacement for the uniform requirements man-

345. Houck & Rolland, *supra* note 337, at 1293.

346. See RODGERS, *supra* note 341, at 385 ("Individual permit supervision is a form of counsel quieter than a strident takeback of approved state authority (abhorrent for a variety of reasons) and should be invoked more often.").

347. See S. REP. NO. 95-370, at 73 (1977), *reprinted in* 1977 U.S.C.C.A.N. 4326, 4398; Houck & Rolland, *supra* note 337, at 1293.

dated by the CWA's NPDES program for point source discharges. Moreover, the multiple opportunities for public involvement and judicial review provided by the CWA, and the ease of enforcement of the NPDES program, weigh heavily in favor of the regulatory regime.

